



# ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

1021 NORTH GRAND AVENUE EAST, P.O. BOX 19276, SPRINGFIELD, ILLINOIS 62794-9276  
JAMES R. THOMPSON CENTER, 100 WEST RANDOLPH, SUITE 11-300, CHICAGO, IL 60601

ROD R. BLAGOJEVICH, GOVERNOR

RENEE CIPRIANO, DIRECTOR

217/524-3300

November 3, 2003

CERTIFIED MAIL

7002 3150 0000 1219 9282

Mr. William F. Connors  
Vice President of Corrective Measures  
Clean Harbors Services, Inc.  
1501 Washington Street  
P. O. Box 859048  
Braintree, Massachusetts 02185-9048

RECEIVED

NOV 25 2003

Re: 0316000051 -- Cook County  
Clean Harbors Services, Inc.  
ILD000608471  
Date Received: April 23, 2003  
Log No. B-16-CA-4  
RCRA Permit

Technical Support and Permits Section  
Waste Management Branch  
Waste, Pesticides and Toxics Division  
U.S. EPA - Region 5

US EPA RECORDS CENTER REGION 5



1000876

Dear Mr. Connors:

This is in response to the April 21, 2003 document entitled Supplemental Phase I RCRA Facility Investigation Report, submitted on your behalf by Carlson Environmental, Inc. This document pertains to soils aspects of RCRA Corrective Action efforts at of the above-referenced facility, as shown in Attachment 1, a Site Layout Map. This map shows that the facility consists of two piers, a northern pier and a southern pier located on either side of Slip No. 6. The northern pier was formerly owned by Chemical Waste Management (CWM) and was incorporated into Clean Harbors' RCRA permit on June 30, 1995. The southern pier is the original Clean Harbors portion of the facility. Attachment 2 shows both piers in more detail.

The subject submittal reports the results of the supplemental soils investigation at the former CWM portion of the facility conducted in accordance with the subject facility's RCRA Permit and an Illinois EPA letter dated March 20, 2002 (Log No. B-16-CA-1). This investigation involved supplemental soil borings and analysis at four SWMUs in the CWM incinerator process area and in the vicinity of monitoring well MW-121S, located near the interim surface impoundments. Attachment 3 shows an overview of the area involved in the supplemental investigation. Attachment 4 shows the location of soil borings in the CWM incinerator process area. Attachment 5 shows the location of soil borings in the vicinity of monitoring well MW-121S.

The Illinois EPA has reviewed the subject submittal and concluded that Clean Harbors fulfilled the requirements of the Illinois EPA letter dated March 20, 2002 (Log No. B-16-CA-1). Clean

Mr. William F. Connors  
Clean Harbors Services, Inc.  
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Harbors correctly made the soil borings, analyzed the samples and reported the results. Soils characterization for the facility is proceeding very well. In fact, Clean Harbors is on track to submit Phase I Soils Corrective Measures Plan (CMP) for the entire facility, i.e., for both portions in one combined document by January 9, 2004.

The Illinois EPA hereby approves the April 21, 2003 submittal subject to the following conditions and modifications:

1. The Illinois EPA agrees with Clean Harbors that a higher tiered TACO analysis should be included in the comprehensive combined report that Clean Harbors is on schedule to submit by January 9, 2004, in accordance with the Illinois EPA letter dated April 9, 2003 (Log Nos. B-16-CA-1 and B-16-CA-3).
2. The scheduled January 9, 2004 soils submittal should also include a Phase I Soils CMP with plans to control any soils issues, for both portions of the facility in a combined report.
3. The only units of the facility that will not be included in the Phase I Soils CMP are the rotary kiln incinerator and associated hazardous waste management units also located in the former CWM incinerator process area the facility. Those units are currently undergoing RCRA closure in accordance with Illinois EPA letters (Log No. C-759 and associated modifications); and TSCA guidance from USEPA by letter dated December 7, 2000.
4. An independent professional engineer licensed under the Illinois Professional Engineering Act should continue to oversee remedial activities at the facility.
5. The attached RCRA Corrective Action Certification Statement should be properly completed, signed by an Illinois P.E. and accompany the scheduled January 9, 2004 Phase I Soils CMP submittal. Signatures must meet the requirements of 35 Ill. Adm. Code 702.126.

Within 35 days of the date of mailing of the Illinois EPA's final decision, the applicant may petition for a hearing before the Illinois Pollution Control Board to contest the decision of the Illinois EPA, however, the 35-day period for petitioning for a hearing may be extended for a period of time not to exceed ninety days by written notice provided to the Board from the applicant and the Illinois EPA within the 35-day appeal period.

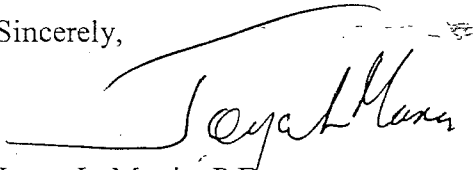
Work required by this letter, your submittals or the regulations may also be subject to other laws governing professional services, such as the Illinois Professional Land Surveyor Act of 1989, the

Mr. William F. Connors  
Clean Harbors Services, Inc.  
Log No. B-16-CA-4  
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Professional Engineering Practice Act of 1989, the Professional Geologist Licensing Act, and the Structural Engineering Licensing Act of 1989. This letter does not relieve anyone from compliance with these laws and the regulations adopted pursuant to these laws. All work that falls within the scope and definitions of these laws must be performed in compliance with them. The Illinois EPA may refer any discovered violation of these laws to the appropriate regulating authority.

Questions on this letter may be directed to Joe Flanagan at 217/557-8913.

Sincerely,

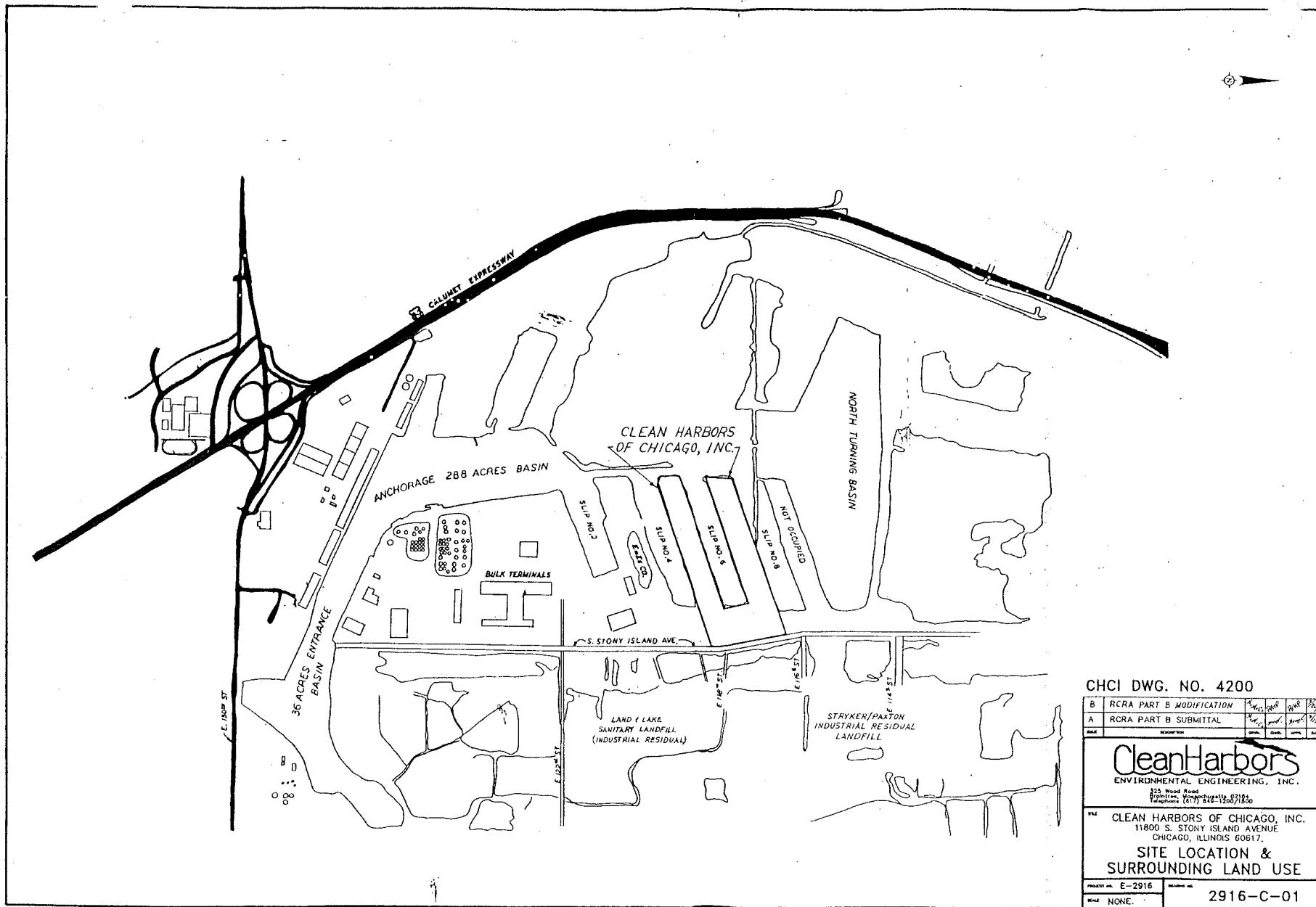


Joyce L. Munie, P.E.  
Manager, Permit Section  
Bureau of Land

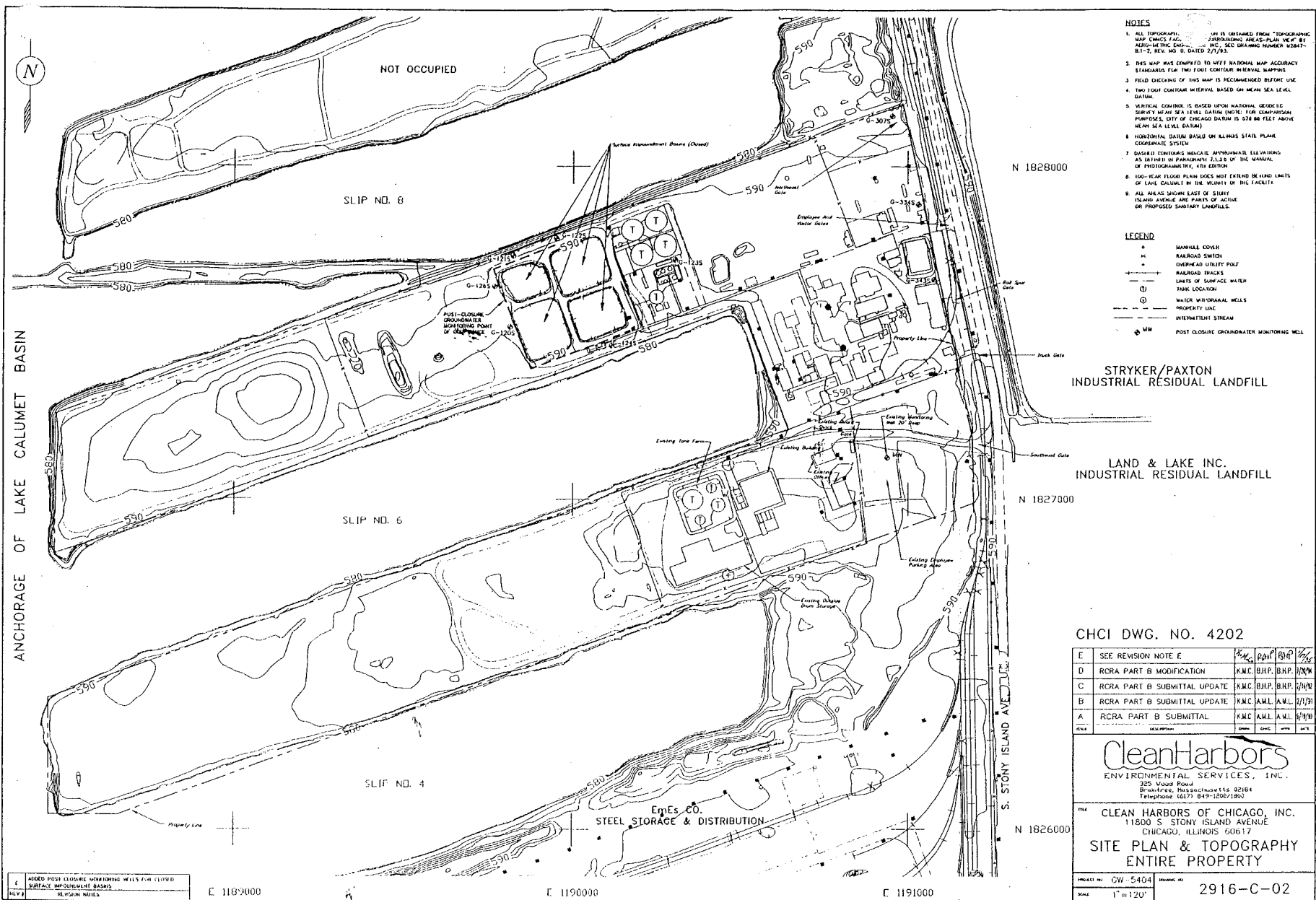
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Attachments: Attachment 1: Site Layout Map  
Attachment 2: Schematic Detailing the Two Piers  
Attachment 3: Layout Showing Area of the Supplemental Investigation  
Attachment 4: Boring Locations in Incinerator Area  
Attachment 5: Boring Locations in MW-121S Area  
RCRA Corrective Action Certification Statement

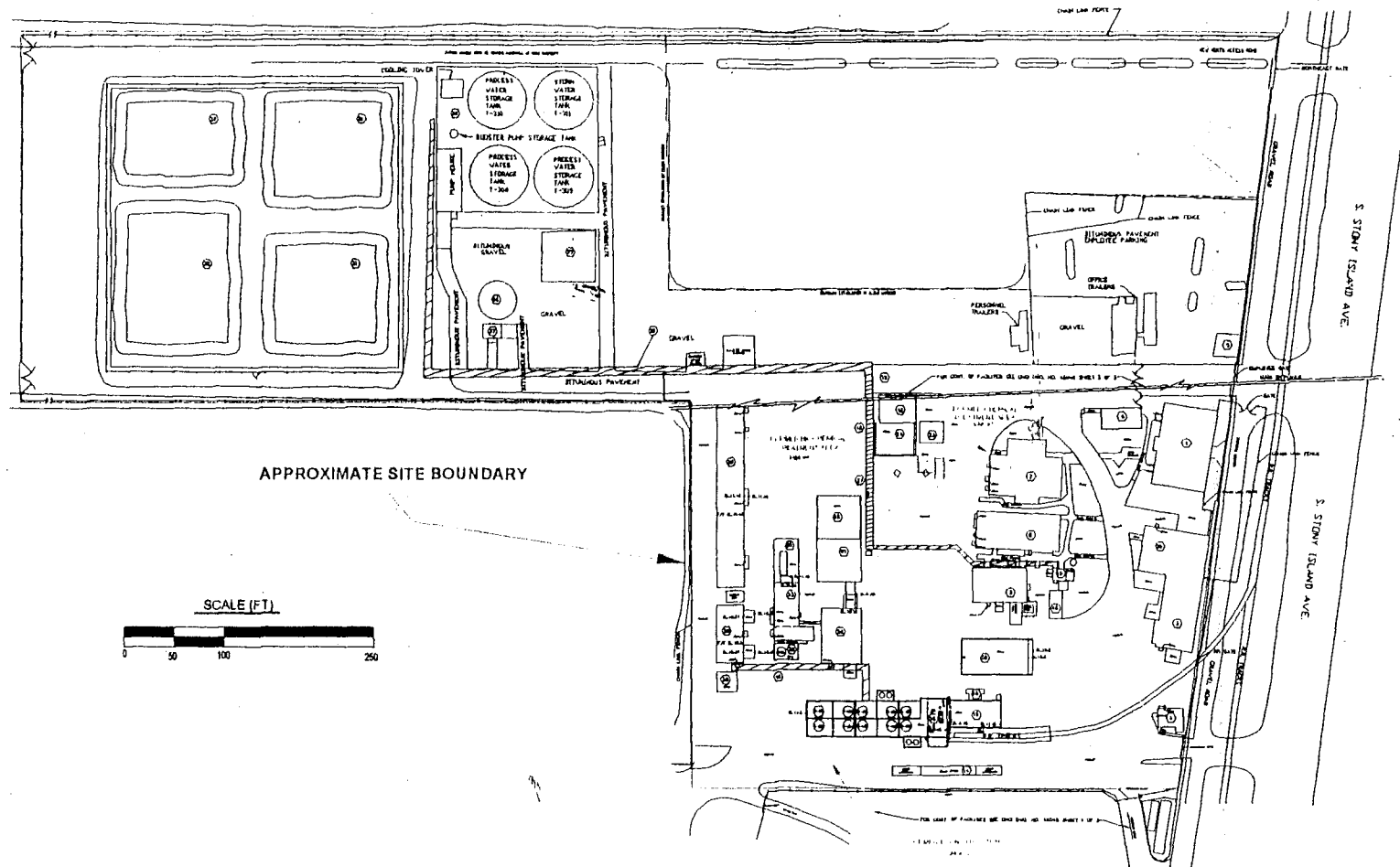
cc: USEPA Region V – Harriet Croke  
Margaret M. Karolyi, P.E., Carlson Environmental, Inc.



Clean Harbors Services, Inc.  
Log No. B-16-CA-4  
Attachment 1



Clean Harbors Services, Inc.  
Log No. B-16-CA-4  
Attachment 2



#### LEGEND

1. OFFICE BUILDING
2. MAINTENANCE BUILDING
3. TRANSPORTATION/RECEIVING BUILDING
4. EAST PUMP HOUSE
5. PERSONNEL/TRAINING CENTER
6. LABORATORY BUILDING
7. CONTROL BUILDING
8. WAREHOUSE LIFT STATION
9. RAIL CAR UNLOADING AREA (SEE CHCI DWG. NO. 4217)
10. TRUCK SCALE

15. TRUCK UNLOADING PLATFORM (SEE CHCI DWG. NO. 4216)
16. FLAMMABLE STORAGE TANK FARM (SEE CHCI DWG. NO. 4215)
17. PIPE RACKS
22. NEUTRALIZING AREA
23. EFFLUENT TREATMENT BUILDING
24. CANELLA SETTLERS
25. CONTAINER MANAGEMENT BUILDING (SEE CHCI DWG. NO. 4210 SHEET 3 OF 3)
26. UNITABLE CONTAINER MANAGEMENT BUILDING (SEE CHCI DWG. NO. 4210 SHEET 2 OF 3)
27. STORM WATER LIFT STATION
28. NITROGEN STORAGE AREA
29. UTILITY BUILDING
30. FUEL OIL STORAGE

38. MAINTENANCE BUILDING ADDITION
40. DECONTAMINATION BUILDING
42. FILTER BUILDING
43. FUELS BLENDING OPERATION (SEE CHCI DWG. NO. 4213 SHEET 2 OF 3)
46. FIRE EQUIPMENT BUILDING
59. TRUCK STAGING AREA (SEE CHCI DWG. NO. 4247)
60. ROLL-OFF PAD FOR FUELS BLENDING (SEE CHCI DWG. NO. 4213 SHEET 2 OF 3)
81. CONTAINER HANDLING DOCK (SEE CHCI DWG. NO. 4245)
82. TRUCK PAD (SEE CHCI DWG. NO. 4216)

5. GUARD HOUSE
18. PIPE RACKS
31. PROCESS WATER COOLING PONDS (NO LONGER IN USE)
32. STORM WATER PONDS (NO LONGER IN USE)
33. NEW PROCESS WATER COOLING & STORAGE SYSTEM
36. FIRE WATER TANK
37. FIRE WATER PUMP HOUSE
55. SEWER PRETREATMENT SYSTEM



**CARLSON ENVIRONMENTAL SERVICES**

65 E. WACKER PLACE  
CHICAGO, ILLINOIS  
(312) 346-2140

Clean Harbors Services, Inc.  
Log No. B-16-CA-4  
Attachment 3

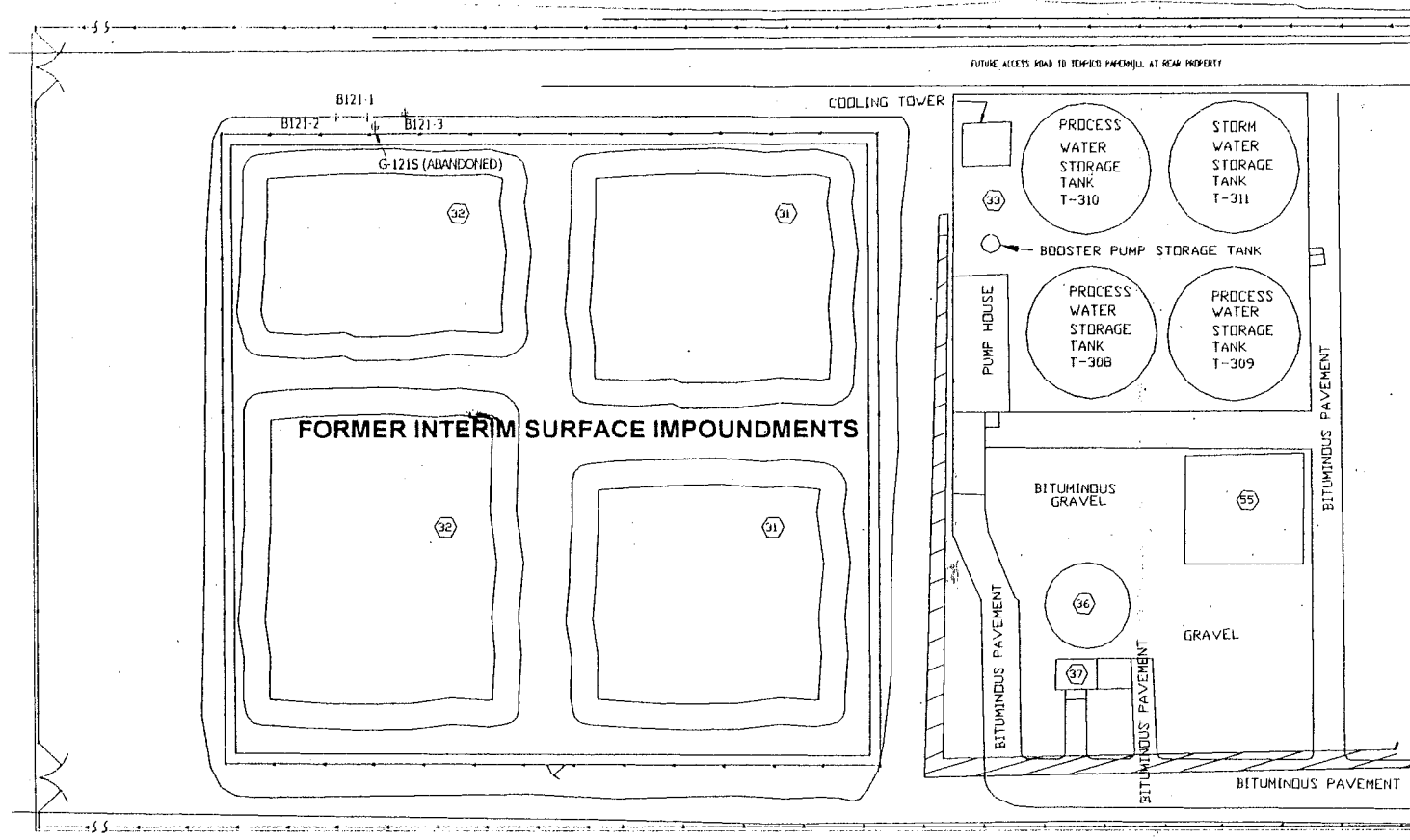
## SITE AND SURROUNDING AREA MAP

Clean Harbors Environmental Services, Inc.  
Chicago, IL

FIGURE:

1





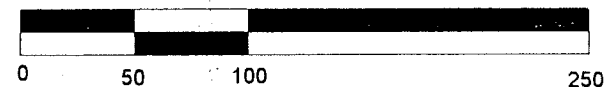
APPROXIMATE SITE BOUNDARY

## LEGEND

B121-2 : APPROXIMATE SOIL BORING LOCATION

G-121S : APPROXIMATE MONITORING WELL LOCATION

## SCALE (FT)



Clean Harbors Services, Inc.  
Log No. B-16-CA-4  
Attachment 5



**CARLSON ENVIRONMENTAL SERVICES**

65 E. WACKER PLACE  
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(312) 346-2140

## APPROXIMATE SOIL BORING LOCATIONS MAP

Clean Harbors Environmental Services, Inc.  
Chicago, IL

FIGURE:





## ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

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JAMES R. THOMPSON CENTER, 100 WEST RANDOLPH, SUITE 11-300, CHICAGO, IL 60601

ROD R. BLAGOJEVICH, GOVERNOR

RENEE CIPRIANO, DIRECTOR

217/524-3300

April 9, 2003

CERTIFIED MAIL

7002 2030 0001 1879 5623

Mr. William F. Connors  
Vice President of Corrective Measures  
Clean Harbors Services, Inc.  
1501 Washington Street  
P. O. Box 859048  
Braintree, Massachusetts 02185-9048

Re: 0316000051 -- Cook County  
Clean Harbors Services, Inc.  
ILD000608471  
Date Received: December 6, 1995, July 25, 1996 and January 2, 1998  
Log Nos. B-16-CA-1 and B-16-CA-3  
RCRA Permit

RECEIVED

APR 21 2003

Technical Support and Permits Section  
Waste Management Branch  
Waste, Pesticides and Toxics Division  
U.S. EPA - Region 5

Dear Mr. Connors:

This is in partial response to two documents submitted by Mr. Jules Selden of Clean Harbors regarding RCRA Corrective Action efforts at the above-referenced facility. The two documents being responded to are: (1) Initial Corrective Measures Program Final Report, (December 4, 1995 and July 22, 1996 submittals regarding proposed remedial activities for the portion of the Clean Harbors facility formerly owned by Chemical Waste Management); and (2) RCRA Facility Investigation Phase II/III Report, (a December 31, 1997 submittal regarding the results of an investigation conducted on the original portion of the Clean Harbors facility).

For a variety of reasons, the remedial activities being carried out at the Clean Harbors are somewhat complicated, and these complications have delayed Illinois EPA's response to the subject submittals. Specifically:

1. Initially, the facility was required to conduct corrective action on twenty-five SWMUs in accordance with the RCRA permit issued by the Illinois EPA on September 30, 1993 (Log No. B-16; effective date of November 4, 1993). On June 30, 1995, the Illinois EPA issued Clean Harbors a revised RCRA permit, which allowed it to incorporate the adjacent Chemical Waste Management property into the facility.
2. The June 30, 1995 permit allowed Clean Harbors to construct some new areas in certain portions of the former CWM property (potential contamination in these areas were

required to be characterized before construction was to begin). Furthermore, this permit required Clean Harbors to submit a Corrective Measures Plan to address contamination previously found at ten SWMUs on the CWM property during an RFI conducted in accordance with a 3008(h) with USEPA. Finally, the permit required Clean Harbors to submit a plan to investigate for potential contamination within the process area of the CWM property, an area which was not fully evaluated under the 3008(h) order, as CWM was conducting hazardous waste management in this area during the required RFI.

3. The issuance of June 30, 1995 permit also required that Clean Harbors complete closure of an incinerator and associated equipment present at the CWM property. A plan to complete these efforts was approved by the Illinois EPA on January 25, 1996 (Log No. C-759 and associated modifications). Modifications to this approved plan have been approved by Illinois EPA on December 7, 2000 and January 16, 2003.

Clean Harbors has been carrying the requirements identified above and has completed a substantial amount of investigative/remedial efforts to date at this facility. As a result of these efforts, it appears as though the most efficient way to complete corrective action at this facility is to address all the SWMUs at the facility as a whole rather than looking at those on the original portion of the facility separate from those on the former CWM property. Thus, it is necessary to ensure that potential contamination with either facility is properly characterized before moving on to identification of required corrective measures.

The Illinois EPA recently approved a plan to characterize soil contamination within the Process Area of the CWM property on March 20, 2002. With only a few data gaps, Clean Harbors has adequately characterized the soil contamination at the SWMUs within the original facility and the ten SWMUs within the CWM property. To bring proper characterization of the soil contamination at the Clean Harbors facility to completion, the Illinois EPA hereby approves the soil-related investigative aspects of the two above-mentioned submittals subject to the following conditions and modifications:

1. This letter only addresses the soil-related aspects of these submittals; the groundwater-related aspects will be addressed at a later date.
2. This letter only approves the need for and scope of additional soil sampling/analysis efforts to fully characterize the extent of soil contamination within the Clean Harbors facility. All decisions regarding remedial activities will be made after the investigation required by this letter are completed and the final report required by Conditions 8, 9, 16, and 17, below evaluating the soil contamination at the facility is approved by the Illinois EPA.

3. Containment is the recommended corrective measure proposed in the Initial Corrective Measures Program Final Report. The Illinois EPA reserves judgment on this recommendation until the appropriate stage of a Corrective Measure Program is completed for both portions of the facility. It is also possible that, in conjunction with TACO, isolated hot-spot removal may also be required.
4. At this point, the facility should take five soil borings in the Eastern portion of the process area in the former CWM-CS portion of the property, referred to in condition 4 of the Illinois EPA letter dated March 20, 2002, Log No. B-16-CA-1, should be taken. For each soil boring, a minimum of two soil samples should be taken, at depths of approximately one foot and four feet, biased toward visually stained soil. The Illinois EPA has shown the location of these five soil borings which are designated as J1, J2, J3, J4, and J5 on Attachment 1. The rationale for requiring these borings is that the Agency record shows very little sampling/analysis has been carried out in the Eastern portion of the process area.
5. For SWMU 9, the Process Water Underground Pipe System, in the former CWM-CS portion of the property, two soil borings should be taken in the process area and two soil borings should be taken in the non-process area. At least two soil samples should be taken for each soil boring. Soil samples at approximate depths of one foot below the bottom of the pipeline and four feet below the bottom of the pipeline, biased toward visually stained soil should be taken. The Illinois EPA has shown the location of these four soil borings, which are designated J6, J7, J8, and J9 on Attachment 2. The rationale for requiring these borings is that the Agency record lacks the data associated with this SWMU, at the depth specified by this approval letter condition. Furthermore, the Initial Corrective Measures Report states on page 19 that no soil or groundwater samples were collected along the former pipeline route during either phase of the RFI.
6. The facility must collect and analyze additional samples as necessary to define the extent of soils contamination in both the original portion and the former CWM-CS portion of the facility.
7. Soil samples collected in accordance with conditions 4, 5, and 6, above shall be analyzed individually (i.e., no compositing). Analytical procedures shall be conducted in accordance with Test Methods for Evaluating Solid Wastes, Third Edition (SW-846). When a SW-846 (Third Edition) analytical method is specified, all the chemicals listed in the Quantitation Limits Table for that method shall be reported unless specifically exempted in writing by the Illinois EPA. To demonstrate a parameter is not present in a sample, analysis results must show a detection limit at least as low as the PQL for that parameter in the third edition of SW-846. For inorganic parameters, the detection limit

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achieved during the analysis of the TCLP extract must be at least as low as the RCRA Groundwater Detection Limits, as referenced in SW-846 (Third Edition) Volume 1A, pages TWO-29 and TWO-30, Table 2-15. All soil samples initially collected for analysis should be analyzed for the following constituents per approved SW-846 methods. Clean Harbors should for the same soil parameters analyzed for in the Initial Corrective Measures Program Final Report for the former portion and for the same parameters analyzed for in the RCRA Facility Investigation Phase II/III Report for the original portion, for samples taken in accordance with conditions 4, 5, and 6, above.

8. Clean Harbors should establish remediation objectives for contaminated soils associated with this project in accordance with 35 IAC Part 742, Tiered Approach to Cleanup Objectives (TACO). A report for both portions of the property, on a combined basis, containing these proposed objectives should be submitted to Illinois EPA within nine months of the date of this letter and Clean Harbors should schedule its associated field investigative activities in such a manner as to meet this deadline. The report should be entitled Combined Soils Investigation, TACO Analysis, and Phase I Corrective Measures Report. The TACO analysis should include past and present soils sampling data, data obtained from both portions of the facility. Information in support of the proposed objectives must also be provided in the report; guidance entitled TACO Requirements for Soil Remediation Objectives Associated with RCRA Projects regarding the organization and presentation of this information is attached. Clean Harbors should take soil samples for pH,  $f_{oc}$ , and other parameters, as Clean Harbors feels appropriate, to include in its TACO analysis, in conjunction with both past and present sampling data. The report to be submitted to the Illinois EPA within nine months of the date of this letter should include a brief conceptual description of the corrective measures they will use to properly remediate soils in both portions of the property, which is essentially a Phase I Corrective Measures Report, for soils. The next step will be a Preliminary Design Report for Corrective Measures (Phase II of Corrective Measures Program).
9. Clean Harbors must submit a Combined Soils Investigation, TACO Analysis, and Phase I Corrective Measures Report documenting the results of the soils investigation required by this letter and the information required by Condition 8, above to the Illinois EPA within nine months of the date of this letter. The owner or operator must submit to the Illinois EPA certification both by a responsible officer of the owner or operator and by an independent registered professional engineer that the facility completed the activities required by this letter in accordance with the specifications in this letter. In addition, a certification statement meeting the requirements of 35 IAC 702.126 must be provided by a responsible officer of the laboratory which conducted the chemical analyses that the requirements of this letter were met during the chemical analyses that the requirements of this letter were met during the chemical analysis of all samples. This certification must

Mr. William F. Connors  
Clean Harbors Services, Inc.  
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address the applicable sample collection, preservation, handling preparation and analytical requirements set forth in this letter. The deadline for submittal to the Illinois EPA of within nine months of the date of this letter may be extended if Clean Harbors submits information to the Illinois EPA indicating that it is attempting to complete the required activities in a timely manner but needs additional time to complete the investigation or submit the report and associated certification.

The attached certification form must be used. Signatures must meet the requirements of 35 Ill. Adm. Code Section 702.126. The independent engineer should be present at all critical, major points (activities) during the soils investigative activities required by this letter. These might include soil sampling, soil removal, backfilling, final cover placement, etc. The frequency of inspections by the independent engineer must be sufficient to determine the adequacy of each critical activity.

The Illinois Professional Engineering Act (Ill. Rev. Stat., Ch. 111, par. 5105 et. seq.) requires that any person who practices professional engineering in the State of Illinois or implies that he (she) is a professional engineer must be registered under the Illinois Professional Engineering Act (par. 5101, Section 1). Therefore, any certification or engineering services, which are performed in accordance with this letter must be done by an Illinois P.E.

Plans and specifications, designs, drawings, reports, and other documents rendered as professional engineering services, and revisions of the above must be sealed and signed by a professional engineer in accordance with par. 5119, Section 13.1 of the Illinois Professional Engineering Act.

As part of the certification, to document the activities at your facility associated with implementation of this letter, please submit a Combined Soils Investigation, TACO analysis, and Phase I Corrective Measures Report which includes, at a minimum for the soils sampling/analysis required by this letter:

- a. The information regarding the required soil sampling/analysis effort at each SWMU where such an investigation is necessary;
- b. Information which this letter indicates will be in the report;
- c. A chronological summary of the activities associated with this letter;
- d. Color photo documentation of the activities associated with this letter;

- e. A description of the qualifications of personnel performing and directing the activities including contractor personnel; and
- f. A general discussion of the activities which were be carried out as part of this investigation.

The original and two (2) copies of all certifications, logs, or reports which are required to be submitted to the Illinois EPA by the facility should be mailed to the following address:

Illinois Environmental Protection Agency  
Division of Land Pollution Control -- #33  
Permit Section  
1021 North Grand Avenue East  
Post Office Box 19276  
Springfield, Illinois 62794-9276

- 10. The Illinois EPA will reserve the option to require further soils investigation to characterize the extent of any contamination detected after implementation of the soils sampling required by this letter. However, it should be the goal to implement the requirements of this letter in such a manner as to complete soils characterization for both portions of the facility.
- 11. The following procedure must be utilized in the collection of all required soil samples:
  - a. The procedures used to collect the soil samples must be sufficient so that all soil encountered is classified in accordance with ASTM Method D-2488.
  - b. If a drill rig or similar piece of equipment is necessary to collect required soil samples, then:
    - (1) The procedures specified in ASTM Method D-1586 (Split Spoon Sampling) or D-1587 (Shelby Tube Sampling) must be used in collecting the samples.
    - (2) Soil samples must be collected continuously at several locations to provide information regarding the shallow geology of the area where the investigation is being conducted;
  - c. All soil samples which will be analyzed for volatile organic compounds (VOCs) must be collected and analyzed in accordance with condition 9. c. of the Illinois EPA approval letter dated March 20, 2002, Log No. B-16-CA-1;

- d. Soil samples not collected explicitly for VOC analysis should be field-screened for the presence of VOCs at all locations where VOCs are a concern;
  - e. All other soil samples must be collected in accordance with the procedures set forth in SW-846; and
  - f. When visually discolored or contaminated material exists within an area to be sampled, horizontal placement of sampling locations shall be adjusted to include such visually discolored and/or contaminated areas. Sample size per interval shall be minimized to prevent dilution of any contamination.
12. Quality assurance/quality control procedures which meet the requirements of SW-846 must be implemented during all required sampling/analysis efforts. In addition, sample collection, handling, preservation, preparation and analysis must be conducted in accordance with the procedures set forth in SW-846 and the requirements set forth in this letter.
13. Any equipment, including heavy earth movers or smaller tools, shall be scraped to remove any residue. Following this, the equipment must be steam cleaned and triple rinsed. All residues, wash and rinse water shall be collected and managed as a hazardous waste if analysis of the waste detects the presence of hazardous constituents or it exhibits a characteristic of hazardous waste. In any event the material must be managed as a special waste.
14. If Clean Harbors conducts an investigation which differs from the activities described in this letter, then it must provide adequate justification in the report for the variances. The Illinois EPA feels that the requirements set forth in this letter are necessary to reach a conclusion that there has not been a release from a given SWMU. If the goals of Clean Harbors are somewhat different than this, then there may be justification for varying from the requirements set forth in this letter.
15. Under the provisions of 29 CFR 1910 (51 FR 15,654, December 19, 1986), cleanup operations must meet the applicable requirements of OSHA's Hazardous Waste Operations and Emergency Response standard.
16. The portion of the Combined Soils Investigation, TACO Analysis, and Phase I Corrective Measures Report documenting the results of the required soil sampling/analysis effort required by this letter must contain the following information, for each SWMU investigated:

- a. A discussion of (1) the reason for the sampling/analysis effort conducted at each SWMU and (2) the goals of the sampling analysis effort conducted at each SWMU;
- b. A scaled drawing showing the horizontal and vertical location where all soil samples were collected at each SWMU;
- c. Justification for the locations from which soil samples were collected;
- d. A description of the procedures used for:
  - (1) Sample collection;
  - (2) Sample preservation;
  - (3) Chain of custody; and
  - (4) Decontamination of sampling equipment.
- e. Visual classification of each soil sample collected for analysis;
- f. A discussion of the results of any field screening efforts;
- g. A description of the soil types encountered during the investigation, including scaled cross-sections;
- h. A description of the procedures used to analyze the soil samples, including:
  - (1) The analytical procedure used, including the procedures, if any, used to prepare the sample for analysis;
  - (2) Any dilutions made to the original sample;
  - (3) Any interferences encountered during the analysis of each sample; and
  - (4) The practical quantitation limit achieved, including justification for reporting PQLs which are above those set forth in SW-846.
- i. A description of all quality control/quality assurance analyses conducted, including the analysis of lab blanks, trip blanks and field blanks;



Mr. William F. Connors  
Clean Harbors Services, Inc.  
Log Nos. B-16-CA-1 and B-16-CA-3  
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- j. A description of all quality assurance/quality control efforts made overall;
  - k. A summary of all analytical data, including QA/QC results, in tabular form;
  - l. Copies of the final laboratory sheets which report the results of the analyses, including final sheets reporting quality assurance/quality control data;
  - m. Colored photographs documenting the sampling effort; and
  - n. A discussion of the collected data. This discussion should identify those sample locations where contaminants were detected and the concentrations of the contaminants. Conclusions which can be drawn from the information compiled should also be included in this discussion.
17. The portion of the Combined Soils Investigation, TACO Analysis, and Phase I Corrective Measures Report documenting the results of the required subsurface investigation required by this letter must contain, at a minimum, the following information for each SWMU:
- a. Logs of the borings made during the required subsurface investigation;
  - b. Procedures used in carrying out the subsurface investigation (including the boring procedures);
  - c. Results of all tests conducted in-situ or in the laboratory;
  - d. A description of the procedures carried out in conducting the tests identified in Condition 17.c, above;
  - e. Scaled drawings showing the location where all borings were made;
  - f. A discussion of the geology and hydrogeology of the areas being investigated, based upon the results obtained from implementation of this letter and previously collected information; and
  - g. A minimum of two cross-sections depicting the subsurface geology and hydrogeology at each area being investigated. These cross-sections should be as close to perpendicular to each other as possible, so that a three-dimensional presentation of this information can be depicted.

Mr. William F. Connors  
Clean Harbors Services, Inc.  
Log Nos. B-16-CA-1 and B-16-CA-3  
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18. On October 2, 1995 Clean Harbors submitted to the Illinois EPA and the USEPA a proposed decontamination / closure plan for the rotary kiln incinerator and associated hazardous waste management units also located in the process area. On January 25, 1996, the Illinois EPA issued a letter approving this decontamination / closure plan subject to certain conditions and modifications, Log No. C-759. On December 7, 2000, the USEPA issued a letter providing comment on and guidance with respect to TSCA on closure of the rotary kiln incinerator and associated hazardous waste management units. Clean Harbors is proceeding to close the rotary kiln incinerator and associated hazardous waste management units in accordance with the October 2, 1995 submittal, the January 25, 1996 approval letter (Log No. C-759 and associated modifications) from the Illinois EPA, and the December 7, 2000 letter from the USEPA providing TSCA guidance. Illinois EPA also approved a subsequent modification request on January 16, 2003 regarding additional investigation efforts at four of the units undergoing closure. Therefore, the subject submittal does not address the closure of these hazardous waste management units.

Within 35 days of the date of mailing of the Illinois EPA's final decision, the applicant may petition for a hearing before the Illinois Pollution Control Board to contest the decision of the Illinois EPA, however, the 35-day period for petitioning for a hearing may be extended for a period of time not to exceed ninety days by written notice provided to the Board from the applicant and the Illinois EPA within the 35-day appeal period.

Work required by this letter, your submittals or the regulations may also be subject to other laws governing professional services, such as the Illinois Professional Land Surveyor Act of 1989, the Professional Engineering Practice Act of 1989, the Professional Geologist Licensing Act, and the Structural Engineering Licensing Act of 1989. This letter does not relieve anyone from compliance with these laws and the regulations adopted pursuant to these laws. All work that falls within the scope and definitions of these laws must be performed in compliance with them. The Illinois EPA may refer any discovered violation of these laws to the appropriate regulating authority.

Mr. William F. Connors  
Clean Harbors Services, Inc.  
Log Nos. B-16-CA-1 and B-16-CA-3  
Page 11

Questions on this letter may be directed to Joe Flanagan at 217/557-8913.

Sincerely,

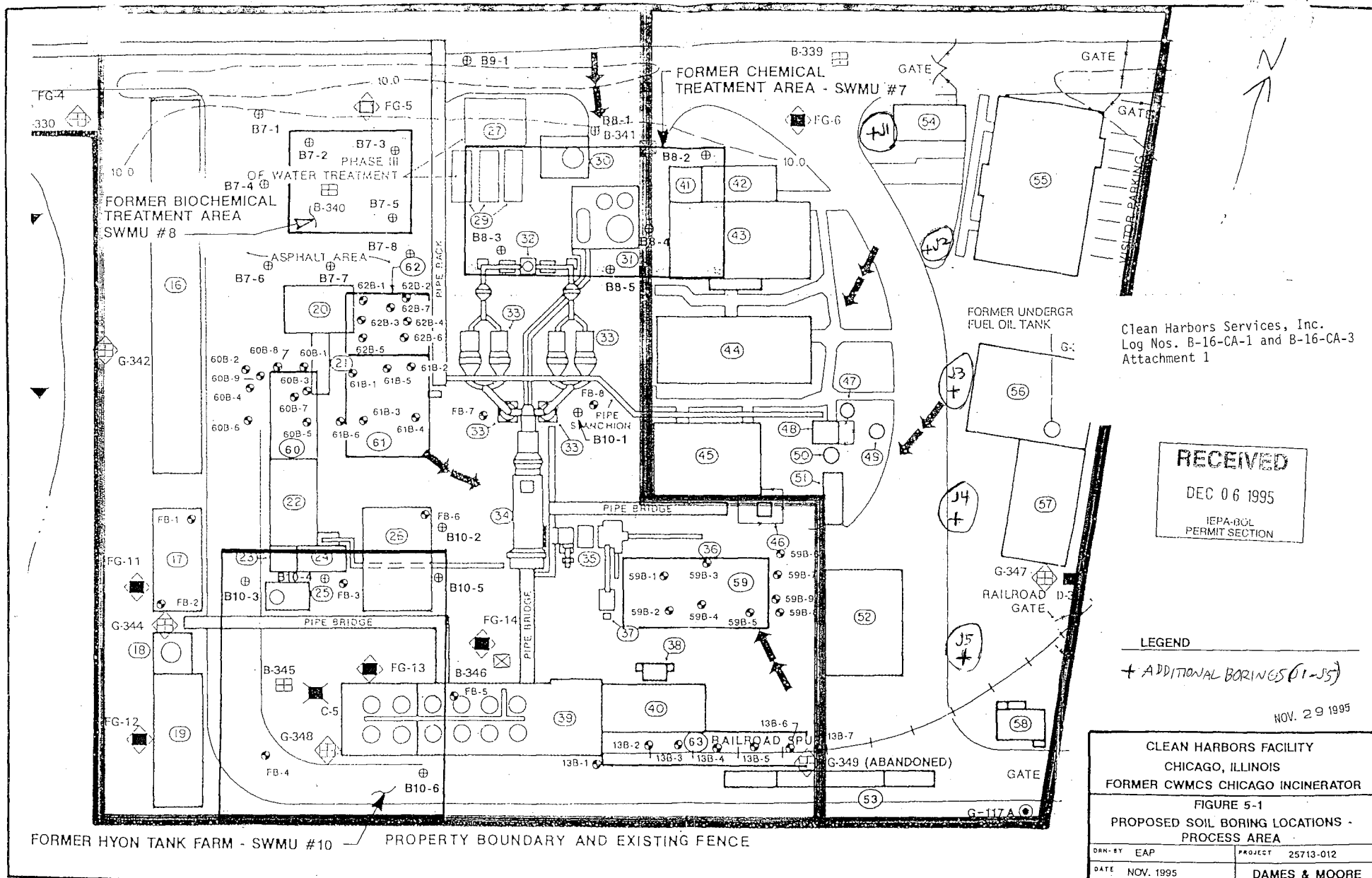


Joyce L. Munie, P.E.  
Manager, Permit Section  
Bureau of Land

JLM:JPF:mls\033372s.doc

<sup>JLM</sup>  
Attachments: Attachment 1: Location of Soil Borings to be Performed in Eastern Portion of  
Process Area, CWM-CS Portion  
Attachment 2: Location of Soil Borings to be Performed in Vicinity of SWMU 9,  
CWM-CS Portion  
TACO Requirements for Soil Remediation Objectives Associated with RCRA  
Projects  
RCRA Corrective Action Certification Statement

cc: USEPA Region V – Harriet Croke  
Margaret M. Karolyi, P.E., Carlson Environmental, Inc.



Clean Harbors Services, Inc.  
Log Nos. B-16-CA-1 and B-16-CA-3  
Attachment 1

RECEIVED

DEC 06 1995

IEPA-BOL  
PERMIT SECTION

LEGEND

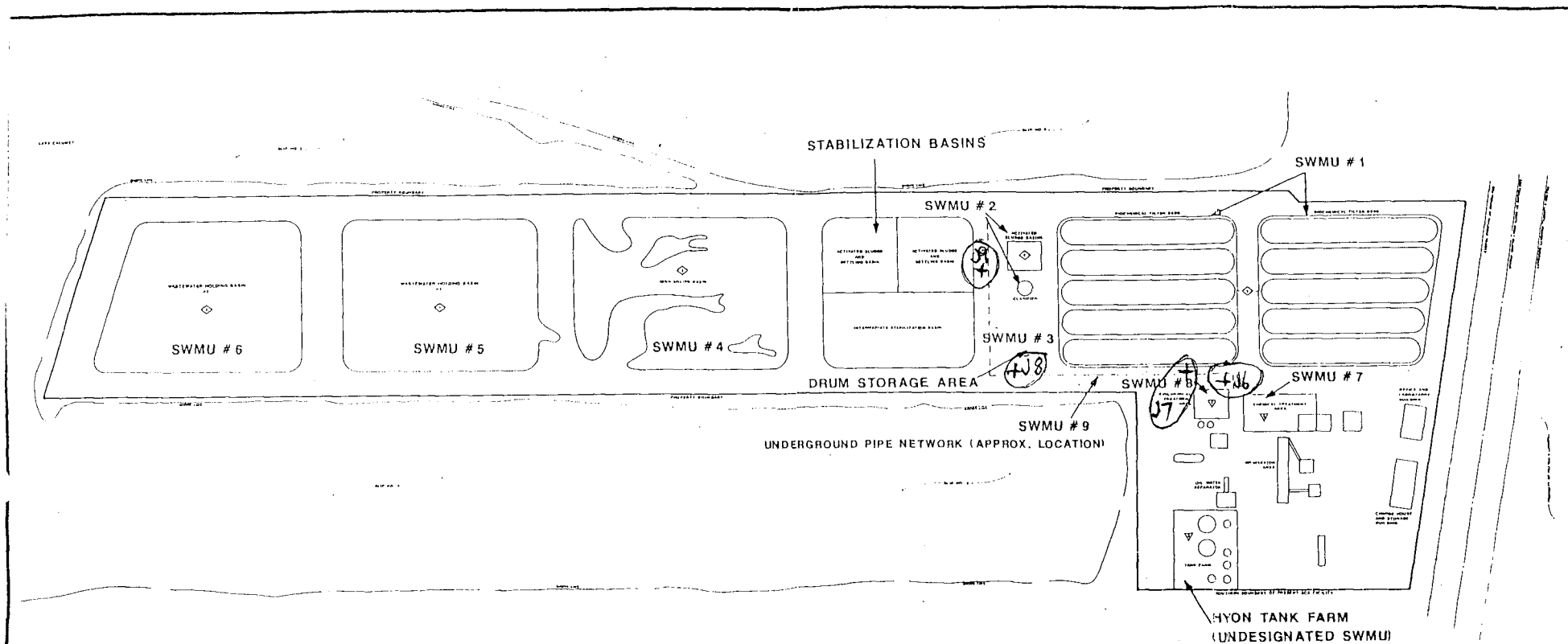
+ ADDITIONAL BORINGS (1-55)

NOV. 29 1995

CLEAN HARBORS FACILITY  
CHICAGO, ILLINOIS  
FORMER CWMCs CHICAGO INCINERATOR

FIGURE 5-1  
PROPOSED SOIL BORING LOCATIONS -  
PROCESS AREA

DRN. BY EAP	PROJECT 25713-012
DATE NOV. 1995	DAMES & MOORE



Clean Harbors Services, Inc.  
Log Nos. B-16-CA-1 and B-16-CA-3  
Attachment 2

# LEGEND

+ ADDITIONAL BRINGS (JES)

0 200 400  
SCALE IN FEET

CWM CHEMICAL SERVICES, INC  
CHICAGO INCINERATOR

FIGURE 3-1  
HYON SWMU'S

OWN-BY	MAG	PROJECT	13963-052
DATE	JUNE 1992	DAMES & MOORE	



## ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

1021 NORTH GRAND AVENUE EAST, P.O. BOX 19276, SPRINGFIELD, ILLINOIS 62794-9276

RENEE CIPRIANO, DIRECTOR

217/524-3300

March 20, 2002

CERTIFIED MAIL

7099 3400 0001 1278 8919

Clean Harbors Services, Inc.  
Attn: Jules B. Selden, Esq.  
1501 Washington Street  
P. O. Box 859048  
Braintree, Massachusetts 02185-9048

Re: 0316000051- Cook County  
Clean Harbors Services, Inc.  
ILD000608471  
Date Received: December 6, 1995; December 11, 2001; January 25, 2002  
Log No. B-16-CA-1  
RCRA Permit

Dear Mr. Selden, Esq.:

This letter is in response to a submittal entitled Supplemental RCRA Facility Investigation (RFI) Phase I Work Plan, dated December 4, 1995, prepared by Dames and Moore on behalf of Clean Harbors. Carlson Environmental, Inc. submitted additional information on behalf of Clean Harbors regarding the work plan on December 10, 2001 and January 23, 2002. The work plan was submitted to the Illinois EPA in accordance with the corrective action requirements of the RCRA permit issued to the above referenced facility (Log No. B-16 and associated modifications).

The Clean Harbors facility is located on the eastern shore of Lake Calumet in Chicago, Cook County, Illinois. The general area in which the site is located is primarily industrial and contains several operating and closed waste treatment, storage, and disposal facilities. The current Clean Harbors facility is located on two man-made earthen piers extending out into Lake Calumet. The piers were constructed in the early 1970s of fill material consisting primarily of cinders, sand, concrete, wood, organic material, and slag from nearby steel mills. Clean Harbors leases the property comprising the facility, i.e., both man-made piers, from the Illinois International Port District. Clean Harbors conducts waste water treatment, fuel blending of waste, and storage transfer of waste on the property in accordance with permits issued by the Illinois EPA.

The northern pier of the Clean Harbors facility is referred to as the former Chemical Waste Management Chemical Services (CWM-CS) portion of the facility. In the past, a hazardous waste incinerator which has now been shut down, decontaminated, dismantled and transported off-site operated on this portion of the facility. The southern pier of the facility is referred to as the

GEORGE H. RYAN, GOVERNOR

Mr. Jules B. Selden, Esq.  
Clean Harbors Services, Inc.  
B-16-CA-1, Supplemental Phase I RFI Work Plan Submittal  
Page 2

original Clean Harbors portion of the facility. A drawing showing the location of the facility is provided as Attachment 1. Attachment 1 is a site layout map highlighting the former CWM-CS portion of the property, which is the portion of the facility which the subject submittal addresses. The subject submittal does not address the original Clean Harbors portion of the facility. Attachment 2 is a schematic showing the ten SWMUs of concern within the former CWM-CS portion of the facility.

On June 30, 1995, the Illinois EPA issued a revised RCRA permit (Log Nos. B-16-M-2 and B-16-M-4) to Clean Harbors allowing them to incorporating the former CWM-CS facility into the permit for the original Clean Harbors portion of the facility, effectively permitting the entire facility to Clean Harbors, under one combined permit. Condition V.B.2 of this permit required Clean Harbors to submit to the Illinois EPA a Supplemental RCRA Facility Investigation (RFI) Work Plan for the process area of the former CWM-CS portion of the facility and soils investigation in the vicinity of Monitoring Well G121S. The process area, shown in Attachment 3 consists of SWMUs 7, 8, part of 9, and 10. Monitoring Well G121S, shown in attachment 4 is near the former interim surface impoundments closed as landfills in 1994, Log No. C-307. The former interim surface impoundments are in the vicinity of the stabilization basins shown in Attachment 2. The Illinois EPA considers the subject submittal appropriate and responsive to condition V.B.2 of the RCRA permit.

In summary, the subject submittal proposes soils investigation for the SWMUs shown in Attachment 3 and in the vicinity of Monitoring Well G121S, as shown in Attachment 4. This work plan is hereby approved subject to the following conditions and modifications:

1. This Supplemental RFI Phase I Work Plan shall be carried out to investigate for possible releases from the following solid waste management units (SWMUs):

<u>SWMU NO.</u>	<u>NAME</u>
7	Chemical Treatment Area
8	Biochemical Treatment Area
9	Process Water Underground Pipe System
10	Hyon Tank Farm

In addition, the area in the vicinity of Monitoring Well G-121S near the closed hazardous waste surface impoundments will be investigated with three proposed soil borings. The location of the proposed borings is shown in Attachment 4. Boring B121-1 should be located next to G-121S and used to provide "deep" information. Boring B121-1 should be advanced and sampled until the native clay is reached at approximately 16 feet. The boring then should be temporarily cased and drilled/sampled deeper to a depth of 22 feet. Borings

Mr. Jules B. Selden, Esq.

Clean Harbors Services, Inc.

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Page 3

B121-2 and B-121-3 should be located approximately 20 feet from location G-121-S. These borings should determine the lateral extent of the "oily fill" encountered in G-121S and G-121P at two apparently discrete intervals (7-10 feet and 14-16 feet). If oily fill is encountered in either interval, additional borings should be advanced at 20-foot increments along the northern boundary of the surface impoundments to verify the lateral extent of contamination.

The purpose of the required Supplemental Phase I investigation is to demonstrate conclusively whether or not hazardous wastes or hazardous constituents have been released from the SWMUs and Monitoring Well location identified above. Therefore, the review of this Supplemental RFI Phase I Work Plan was conducted with this goal in mind.

2. On October 2, 1995 Clean Harbors submitted to the Illinois EPA and the USEPA a proposed decontamination / closure plan, for the rotary kiln and associated hazardous waste management units, also located in the process area. On January 25, 1996, the Illinois EPA issued a letter approving this decontamination/closure plan subject to certain conditions and modifications, Log No. C-759. On December 7, 2000, the USEPA issued a letter providing comment on and guidance with respect to TSCA on closure of the rotary kiln incinerator and associated hazardous waste management units. Clean Harbors is proceeding to close the rotary kiln incinerator and associated hazardous waste management units in accordance with the October 2, 1995 submittal, the January 25, 1996 approval letter from the Illinois EPA, and the December 7, 2000 letter from the USEPA providing TSCA guidance. Therefore, the subject submittal does not address the closure of these hazardous waste management units.
3. The subject submittal did not propose groundwater investigation as the RCRA permit did not require groundwater to be addressed in this Phase I Supplemental Work Plan. Groundwater in and around the units being investigated may need to be addressed in the future, if soil contamination is found to extend to the water table. It is possible that for future submittals activities may be combined for both portions of the facility.
4. The subject submittal proposes no soils investigation the Eastern portion of process area as shown on Attachment 3. There is also very little past data for this area. The Illinois EPA and Clean Harbors have in the past agreed to some soils investigation in this area. However, the Illinois EPA, based on an interview with a Clean Harbors employee, considers the Eastern portion a lower priority area than the Western portion, for which Clean Harbors has proposed investigation. Therefore, in order to proceed as quickly as possible with the higher priority area the Illinois EPA is approving the work plan on the condition that the Eastern portion will be investigated later. The investigation for the Eastern portion shall be undertaken along with future activities at the facility.



Mr. Jules B. Selden, Esq.

Clean Harbors Services, Inc.

B-16-CA-1, Supplemental Phase I RFI Work Plan Submittal

Page 4

5. Supplemental RFI Phase I activities should be completed by January 20, 2003. When the Supplemental Phase I is complete, the owner or operator must submit to the Illinois EPA certification both by a responsible officer of the owner or operator and by an independent registered professional engineer that the facility completed the Supplemental Phase I in accordance with the specifications in the approved RFI Phase I work plan. In addition, a certification statement meeting the requirements of 35 IAC 702.126 must be provided by a responsible officer of the laboratory which conducted the chemical analyses that the requirements of this letter were met during the chemical analyses that the requirements of this letter were met during the chemical analysis of all samples. This certification must address the applicable sample collection, preservation, handling preparation and analytical requirements set forth in this letter. These certifications should be submitted to the Illinois EPA after completing Supplemental Phase I by April 21, 2003. These dates may be extended if Clean Harbors submits information to the Illinois EPA indicating that it is attempting to complete the required activities in a timely manner but needs additional time to complete the investigation.

The attached certification forms must be used. Signatures must meet the requirements of 35 Ill. Adm. Code Section 702.126. The independent engineer should be present at all critical, major points (activities) during the Supplemental RFI. These might include soil sampling, soil removal, backfilling, final cover placement, etc. The frequency of inspections by the independent engineer must be sufficient to determine the adequacy of each critical activity.

The Illinois Professional Engineering Act (Ill. Rev. Stat., Ch. 111, par. 5105 et. seq.) requires that any person who practices professional engineering in the State of Illinois or implies that he (she) is a professional engineer must be registered under the Illinois Professional Engineering Act (par. 5101, Section 1). Therefore, any certification or engineering services which are performed for a RFI work plan in the State of Illinois must be done by an Illinois P.E. The Agency recognizes the fact that Clean Harbors has changed consultants since submittal of the Supplemental RFI Phase I Work Plan. Therefore, the project management personnel specified the subject submittal will change. However, the characterization activities must be overseen by a professional engineer registered under the Illinois Professional Engineering Act.

Plans and specifications, designs, drawings, reports, and other documents rendered as professional engineering services, and revisions of the above must be sealed and signed by a professional engineer in accordance with par. 5119, Section 13.1 of the Illinois Professional Engineering Act.

Mr. Jules B. Selden, Esq.  
Clean Harbors Services, Inc.  
B-16-CA-1, Supplemental Phase I RFI Work Plan Submittal  
Page 5

As part of the certification, to document the Supplemental RFI Phase I activities at your facility, please submit a Supplemental Phase I Report and Summary which includes, at a minimum:

- a. The information regarding the required soil sampling/analysis effort at each SWMU where such an investigation is necessary.
- b. Information which the work plan indicates will be in the report;
- c. A chronological summary of Supplemental Phase I activities and the cost involved.
- d. Color photo documentation of Supplemental Phase I activities.
- e. A description of the qualifications of personnel performing and directing the RFI activities including contractor personnel.
- f. A general discussion of the activities which should be carried out as part of Phase 2 of the RCRA Facility Investigation. It is possible that future soils investigation activities, if any are required, will be undertaken in combination with other activities at the facility. It is also possible that further soils investigation for the areas associated with this work plan will not be required upon completion of the Supplemental Phase I activities, which include a TACO analysis per condition 6, below.

The original and two (2) copies of all certifications, logs, or reports which are required to be submitted to the Illinois EPA by the facility should be mailed to the following address:

Illinois Environmental Protection Agency  
Division of Land Pollution Control -- #33  
Permit Section  
1021 North Grand Avenue East  
Post Office Box 19276  
Springfield, Illinois 62794-9276

6. Clean Harbors must establish remediation objectives for contaminated soils associated with this project in accordance with 35 IAC Part 742, Tiered Approach to Cleanup Objectives (TACO). A report containing these proposed objectives should be submitted to Illinois EPA. However this report is to be prepared after completion of site investigation at the respective portions of the site. The site will then be addressed as a whole with a TACO analysis. The TACO analysis should include both past soils sampling data, data obtained

from implementation of the Phase I Supplemental Workplan, and all other past and future investigation data obtained from the respective portions of the site. Information in support of the proposed objectives must also be provided in the report; guidance entitled TACO Requirements for Soil Remediation Objectives Associated with RCRA Projects regarding the organization and presentation of this information is attached.

7. If the Illinois EPA determines that implementation of this Supplemental RFI Work Plan fails to satisfy the requirements of Section V.B.2 of the RCRA Part B Permit (Log Nos. B-16-M-2 and B-16-M-4), the Illinois EPA reserves the right to require that additional work be completed to satisfy these requirements. Revisions of RFI Work Plans are subject to the appeal provisions of Section 40 of the Illinois Environmental Protection Act.
8. All soil samples shall be analyzed individually (i.e., no compositing). Analytical procedures shall be conducted in accordance with Test Methods for Evaluating Solid Wastes, Third Edition (SW-846). When a SW-846 (Third Edition) analytical method is specified, all the chemicals listed in the Quantitation Limits Table for that method shall be reported unless specifically exempted in writing by the Illinois EPA. There should be two soil samples analyzed for each soil boring in the Process Area. Soil samples should be collected at depths of approximately one foot and four feet, biased toward visually contaminated soil. This is to ensure adequate sampling to properly delineate this area. The Illinois EPA is also requiring sampling and analysis at approximate depths of one foot and four feet as this should be sufficient to determine if no further action is required. To demonstrate a parameter is not present in a sample, analysis results must show a detection limit at least as low as the PQL for that parameter in the third edition of SW-846. For inorganic parameters, the detection limit achieved during the analysis of the TCLP extract must be at least as low as the RCRA Groundwater Detection Limits, as referenced in SW-846 (Third Edition) Volume 1A, pages TWO-29 and TWO-30, Table 2-15. All soil samples initially collected for analysis should be analyzed for the following constituents per approved methods as specified in Table 6-3 of subject submittal:
  - Volatile Organic Compounds (VOCs);
  - Antimony, arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, thallium, and zinc;
  - Semivolatile organic/organochlorine pesticides/PCBs and herbicides; and
  - pH.

Mr. Jules B. Selden, Esq.

Clean Harbors Services, Inc.

B-16-CA-1, Supplemental Phase I RFI Work Plan Submittal

Page 7

9. The following procedure must be utilized in the collection of all required soil samples:
  - a. The procedures used to collect the soil samples must be sufficient so that all soil encountered is classified in accordance with ASTM Method D-2488.
  - b. If a drill rig or similar piece of equipment is necessary to collect required soil samples, then:
    - (1) The procedures specified in ASTM Method D-1586 (Split Spoon Sampling) or D-1587 (Shelby Tube Sampling) must be used in collecting the samples.
    - (2) Soil samples must be collected continuously at several locations to provide information regarding the shallow geology of the area where the investigation is being conducted;
  - c. All soil samples which will be analyzed for volatile organic compounds (VOCs) must be collected in accordance with Attachment A of the Illinois EPA's RCRA closure plan guidance, which is attached or Method 5035 of SW-846 (the tube sampling device described in Attachment A of the Illinois EPA's RCRA closure plan guidance is an acceptable sample collection device to meet the requirements of Method 5035). The sampling methodology proposed by Carlson Environmental, Inc. in Comment No. 4 of its January 23, 2002 submittal is in accordance with Method 5035 and acceptable to the Illinois EPA;
  - d. Soil samples not collected explicitly for VOC analysis should be field-screened for the presence of VOCs at all locations where VOCs are a concern;
  - e. All other soil samples must be collected in accordance with the procedures set forth in SW-846; and
  - f. When visually discolored or contaminated material exists within an area to be sampled, horizontal placement of sampling locations shall be adjusted to include such visually discolored and/or contaminated areas. Sample size per interval shall be minimized to prevent dilution of any contamination.
10. Quality assurance/quality control procedures which meet the requirements of SW-846 must be implemented during all required sampling/analysis efforts. In addition, sample collection, handling, preservation, preparation and analysis must be conducted in accordance with the procedures set forth in SW-846 and the requirements set forth in this letter.

Mr. Jules B. Selden, Esq.

Clean Harbors Services, Inc.

B-16-CA-1, Supplemental Phase I RFI Work Plan Submittal

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11. Any equipment, including heavy earth movers or smaller tools, shall be scraped to remove any residue. Following this, the equipment must be steam cleaned and triple rinsed. All residues, wash and rinse water shall be collected and managed as a hazardous waste if analysis of the waste detects the presence of hazardous constituents or it exhibits a characteristic of hazardous waste. In any event the material must be managed as a special waste.
12. If the Illinois EPA's DLPC determines, based on the data obtained from the Supplemental Phase I Work Plan activities, that there has been no release of hazardous waste or hazardous constituents to the environment from a SWMU identified in Condition 1 above, then no further investigative action will be required for that SWMU. If the Illinois EPA's DLPC determines, based on the data, that there has been a release of hazardous waste or hazardous constituents to the environment or that the data is inconclusive, the Permittee will be notified by the Illinois EPA's DLPC.
13. If Clean Harbors conducts a Supplemental Phase I investigation which differs from the activities described in the work plan and as modified by this letter, then it must provide adequate justification in the report for the variances. The Illinois EPA feels that the requirements set forth in this letter are necessary to reach a conclusion that there has not been a release from a given SWMU. If the goals of Clean Harbors are somewhat different than this, then there may be justification for varying from the requirements set forth in this letter.
14. The Health and Safety Plan contained in the subject work plan is neither approved nor disapproved. Under the provisions of 29 CFR 1910 (51 FR 15,654, December 19, 1986), cleanup operations must meet the applicable requirements of OSHA's Hazardous Waste Operations and Emergency Response standard. These requirements include hazard communication, medical surveillance, health and safety programs, air monitoring, decontamination and training. General site workers engaged in activities that expose or potentially expose them to hazardous substances must receive a minimum of 40 hours of safety and health training off site plus a minimum of three days of actual field experience under the direct supervision of a trained experienced supervisor. Managers and supervisors at the cleanup site must have at least an additional eight hours of specialized training on managing hazardous waste operations.
15. The portion of the final Supplemental RFI Phase I report documenting the results of the required soil sampling/analysis effort must contain the following information, for each SWMU investigated:

Mr. Jules B. Selden, Esq.

Clean Harbors Services, Inc.

B-16-CA-1, Supplemental Phase I RFI Work Plan Submittal

Page 9

- a. A discussion of (1) the reason for the sampling/analysis effort conducted at each SWMU and (2) the goals of the sampling analysis effort conducted at each SWMU;
- b. A scaled drawing showing the horizontal and vertical location where all soil samples were collected at each SWMU;
- c. Justification for the locations from which soil samples were collected;
- d. A description of the procedures used for:
  - (1) Sample collection;
  - (2) Sample preservation;
  - (3) Chain of custody; and
  - (4) Decontamination of sampling equipment.
- e. Visual classification of each soil sample collected for analysis;
- f. A discussion of the results of any field screening efforts;
- g. A description of the soil types encountered during the investigation, including scaled cross-sections;
- h. A description of the procedures used to analyze the soil samples, including:
  - (1) The analytical procedure used, including the procedures, if any, used to prepare the sample for analysis;
  - (2) Any dilutions made to the original sample;
  - (3) Any interferences encountered during the analysis of each sample; and
  - (4) The practical quantitation limit achieved, including justification for reporting PQLs which are above those set forth in SW-846.

Mr. Jules B. Selden, Esq.

Clean Harbors Services, Inc.

B-16-CA-1, Supplemental Phase I RFI Work Plan Submittal

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- i. A description of all quality control/quality assurance analyses conducted, including the analysis of lab blanks, trip blanks and field blanks;
  - j. A description of all quality assurance/quality control efforts made overall;
  - k. A summary of all analytical data, including QA/QC results, in tabular form;
  - l. Copies of the final laboratory sheets which report the results of the analyses, including final sheets reporting quality assurance/quality control data;
  - m. Colored photographs documenting the sampling effort; and
  - n. A discussion of the collected data. This discussion should identify those sample locations where contaminants were detected and the concentrations of the contaminants. Conclusions which can be drawn from the information compiled should also be included in this discussion.
16. The portion of the final Supplemental RFI report documenting the results of the required subsurface investigation must contain, at a minimum, the following information for each SWMU:
- a. Logs of the borings made during the required subsurface investigation;
  - b. Procedures used in carrying out the subsurface investigation (including the boring procedures);
  - c. Results of all tests conducted in-situ or in the laboratory;
  - d. A description of the procedures carried out in conducting the tests identified in Condition .c above;
  - e. Scaled drawings showing the location where all borings were made;
  - f. A discussion of the geology and hydrogeology of the areas being investigated, based upon the results of the Supplemental Phase I investigation efforts and previously collected information; and
  - g. A minimum of two cross-sections depicting the subsurface geology and hydrogeology at each area being investigated. These cross-sections should be as close to

Mr. Jules B. Selden, Esq.  
Clean Harbors Services, Inc.  
B-16-CA-1, Supplemental Phase I RFI Work Plan Submittal  
Page 11

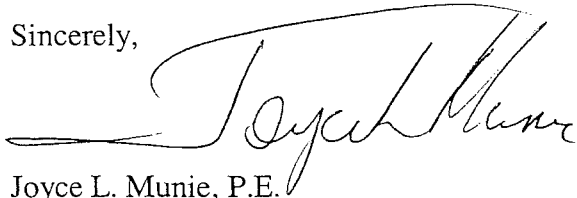
perpendicular to each other as possible, so that a three-dimensional presentation of this information can be depicted.

Within 35 days of the date of mailing of the Illinois EPA's final decision, the applicant may petition for a hearing before the Illinois Pollution Control Board to contest the decision of the Illinois EPA, however, the 35-day period for petitioning for a hearing may be extended for a period of time not to exceed ninety days by written notice provided to the Board from the applicant and the Illinois EPA within the 35-day appeal period.

Work required by this letter, your submittals or the regulations may also be subject to other laws governing professional services, such as the Illinois Professional Land Surveyor Act of 1989, the Professional Engineering Practice Act of 1989, the Professional Geologist Licensing Act, and the Structural Engineering Licensing Act of 1989. This letter does not relieve anyone from compliance with these laws and the regulations adopted pursuant to these laws. All work that falls within the scope and definitions of these laws must be performed in compliance with them. The Illinois EPA may refer any discovered violation of these laws to the appropriate regulating authority.

Should you have any questions regarding this letter, please contact Joe Flanagan at 217/557-8913.

Sincerely,



Joyce L. Munie, P.E.  
Manager, Permit Section  
Bureau of Land

JLM:JPF\mls\023001s.doc

Attachments: Attachment 1: Facility Location Map  
Attachment 2: Schematic Showing Former CWM-CS portion of Facility  
Attachment 3: Schematic Showing Process Area and Associated Soil Borings  
Attachment 4: Schematic Showing Monitoring Well G121S and Associated Soil Borings  
RFI Supplemental Phase I Certification  
RFI Supplemental Phase I Laboratory Certification Statement  
TACO Requirements for Soil Remediation Objectives Associated with RCRA Projects  
IEPA RCRA Closure Guidance Attachment A

cc: USEPA Region V -- Harriet Croke  
Margaret M. Karolyi, P.E., Carlson Environmental, Inc.



Certification Statement  
Clean Harbors  
Chicago, IL  
RFI Supplemental Phase I  
Log No. B-16-CA-1

Upon completion of the corrective action activities at Clean Harbors, this statement is to be completed by both a responsible officer of the owner/operator (as defined in 35 Ill. Adm. Code 702.126) and by an independent licensed professional engineer overseeing all work associated with this investigation. Submit one copy of the certification with original signatures and two additional copies.

The corrective action activities at Clean Harbors have been completed in accordance with the specifications in the approved plan. I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

\_\_\_\_\_  
USEPA ID Number

\_\_\_\_\_  
Facility Name

\_\_\_\_\_  
Signature of Owner/Operator      Date  
Responsible Officer

\_\_\_\_\_  
Name and Title of Owner/Operator  
Responsible Officer

\_\_\_\_\_  
Signature of Licensed P.E.      Date

\_\_\_\_\_  
Name of Licensed P.E. and Illinois License  
Number

Mailing Address of P.E.:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Licensed P.E.'s Seal:

Laboratory Certification Statement

Clean Harbors

Chicago, IL

RFI Supplemental Phase I

Log No. B-16-CA-1

Upon completion of the sampling/analysis activities at Clean Harbors, this statement is to be completed by both (1) a responsible officer of the owner/operator (as defined in 35 Ill. Adm. Code 702.126) and (2) a responsible officer (as defined in 35 Ill. Adm. Code 702.126) of the laboratory which conducted the chemical analyses required as part of the work plan.

The sample collection, handling, preservation, preparation and analysis conducted as part of the site investigation at the facility described in this document have been conducted in accordance with the specifications in the approved work plan. I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

\_\_\_\_\_  
USEPA ID Number

\_\_\_\_\_  
Facility Name

\_\_\_\_\_  
Signature of Owner/Operator      Date  
Responsible Officer

\_\_\_\_\_  
Name and Title of Owner/Operator  
Responsible Officer

\_\_\_\_\_  
Name of Laboratory      Date

\_\_\_\_\_  
Signature of Laboratory      Date  
Responsible Officer

Mailing Address of Laboratory:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
Name and Title of Laboratory Responsible  
Officer

B-16-CA-1

cc: Maywood  
USEPA

Juan

JKN  
-FF



ENVIRONMENTAL SERVICES, INC.

1501 WASHINGTON STREET, PO BOX 850327•BRAINTREE, MA 02185-0327  
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- RFI - ILD000  
608471

WRITER'S DIRECT NUMBER

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LAW DEPARTMENT

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May 28, 1997

Illinois Environmental Protection Agency  
Attn: Thomas Fiersten  
Permit Section, Bureau of Land  
2200 Churchill Road  
Springfield, Illinois 62794-9276

Re: 0316000051 - Cook County  
Clean Harbors Services, Inc.  
ILD000608471  
Log No. 16  
RCRA Permit

RECEIVED

JUN - 2 1997

IEPA-BOL  
PERMIT SECTION

Dear Mr. Fiersten:

Clean Harbors Services, Inc. and its consultants, Carlson Environmental, Inc. and Dames & Moore, Inc. have reviewed the Draft Agency Memorandum which you prepared and provided to Clean Harbors for review and comment. First I would like to thank you very much for giving us the opportunity to review and comment on the draft. Our consolidated comments are set forth below, following the format of the Draft Memorandum.

#### Executive Summary

The following summarizes our comments, each which are set forth in more detail in the specific sections which follow the Executive Summary.

The completion of the Phase II/III RFI (for the original Clean Harbors facility), is an appropriate time to assess combining corrective action activities for both sites. It will be more efficient/beneficial to combine the corrective action activities for both portions of the



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facility. An RFI Phase II/III report is scheduled to be submitted by November 1997, and will address the conclusions outlined in the Draft Memorandum. It is recommended that the revised Supplemental RFI Work Plan (for the former CWM-CS portion of the facility) be prepared in conjunction with the Phase I Corrective Measures Program Work Plan which addresses the entire facility.

The denial of the Groundwater Management Zone (GMZ) application for the former CWM-CS portion of the facility resulted from conflicting regulatory requirements (e.g., the RCRA Part B Permit requirements for the ICMP, and the 35 Ill. Adm. Code Part 620.250 definition). A GMZ application for both the CWM-CS and original portion of the Clean Harbors facilities should be made when the Corrective Action Plan is selected. Based on the Draft Memorandum, the timing for the future GMZ application is not clear. To define the three dimensional area for inclusion in the GMZ, an application should be made when the Corrective Action Plan is selected (Phase II CMP), not when the plan is implemented as suggested in some portions of the Memorandum.

For soil samples collected during the Pre-Construction Soil Boring Program (within the former CWM-CS process area) that yielded exceedances of Tier 2 screening levels, a specific corrective action (i.e., hot spot removal) may not be required. Tier 3 Cleanup Objectives, to be determined during the Phase I CMP, will consider the practicality of such a corrective action beneath or near existing buildings.

It appears premature to conclude that activities associated with future hot spot removal need to be implemented. This is based on consideration of the presumed containment remedy, which may include capping and a groundwater treatment system. It also considers the potentially large volume of soil at the CWM-CS pier area SWMUs that will be in exceedance of Tier 2 screening levels, and the likely higher Tier 3 Cleanup Objective levels that will be calculated during the Phase I CMP. Furthermore, while we agree that containment is an effective option, however, due to the wide spread contamination and the large area of the combined facility, this is most-likely an extremely costly option. Less costly options may be available and just as effective.

The additional requirements for the Phase I CMP Work Plan, suggested by IEPA on Pages 17-18 of the Draft Memorandum, appear unclear as to their rationale relative to the containment remedy, are impractical to implement, or are redundant based on existing data.

The revised goals of the Phase I Supplemental RFI Work Plan, as suggested by IEPA on Page 19 of the Draft Memorandum, appear not to



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recognize the practical implications associated with the containment remedy.

## **I. Facility Background**

No comments. We agree with the IEPA's summary of the site history.

## **II. Investigation/Remediation History**

### **II.A Closure Activities**

The figure used to reference closure activities at the former CWM-CS process area (Attachment 2 of the Draft Memorandum) should be replaced. Attachment 2 does not correctly reference the location of the closed or decontaminated units within the process area listed in the Memorandum. Use of a location map referencing these closed units (Clean Harbors Site Plan - Existing Facilities, Figure III-2 in IEPA Draft Comments on Phase I Supplemental RFI Work Plan) would be more appropriate.

### **II.B Corrective Action Activities**

#### RFI and Other Investigation Activities at the Former CWM-CS Facility

Based on the RFI results, the statement concerning the distribution of constituents of concern (COCs) at the four listed SWMUs requires clarification. The distribution of metals and some SVOCs (e.g., flouranthene and pyrene) show a homogeneity throughout the fill. This distribution is not associated with the SWMUs. Therefore, corrective measures should not concentrate on the COCs that include these analytes.

#### RFI Activities at the Original Portion of the Clean Harbors Facility

We agree with the IEPA's summary of the investigations and information collected to date. The combined RFI Phase II/III activities are currently underway, and a report summarizing these activities is scheduled to be submitted to the IEPA by November 1997. We do, however, take issue with the IEPA's conclusion that metals contamination is the result of past waste management activities. IEPA should consider the results of metals contaminant distributions seen at the CWM-CS site, since similar construction material used as fill at the CWM-CS site was likely used to construct the pier on the original Clean Harbors portion of the facility.



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## **II.C Other Investigative Efforts**

The following comments concern Tier 2 screening level exceedances associated with soil analytical results from the Pre-Construction Soil Boring Program (within the former CWM-CS process area), and the need for additional corrective measures.

The concentration of soil contaminants detected in samples collected during the Pre-Construction Soil Boring Program are generally low. Only two sample locations (60B-3 and 60B-5: Unit 60) show levels above the Tier 2 screening levels calculated by IEPA (ref. IEPA Draft Comments on Phase I Supplemental RFI Work Plan). At these locations, benzene and 2,4-dichlorophenol, respectively, were shown above the Tier 2 screening levels (SLs). Tier 2 and/or Tier 3 Cleanup Objectives will be calculated during the Phase I Corrective Measures Program. These Cleanup Objectives may be higher than the Tier 2 SLs calculated by IEPA. However, the existing building in Area 60 would likely make remediation impractical. While the data from this additional investigation can be used to assess an overall containment corrective measure, it does not appear to warrant a specific corrective action (i.e., hot spot removal) for the affected soils at this time.

## **III. Facility Geology/Hydrology**

No comments. We agree with the IEPA's summary of the site geology/hydrology.

## **IV. Information Regarding the Subject Reports**

### **IV.A RCRA Facility Investigation Phase II/III Work Plan (May 1996)**

We agree with the IEPA's summary of the investigations and information collected to date. The combined RFI Phase II/III activities are currently underway, and a report summarizing these activities is scheduled to be submitted to the IEPA by November 1997.

Upon completion of the RFI Phase II/III Report, we will be able to provide an initial determination of ground water quality and potential corrective measures for the original portion of the facility. The Draft Memorandum indicates that, based on initial sampling results, containment (i.e., engineered barriers and institutional controls) is a viable corrective measure for the site. While we agree that containment may be an effective option, there are several additional alternatives that will need to be addressed prior to selecting the



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preferred alternative. Factors such as cost, time frames and actual risks need to be thoroughly investigated and compared prior to determining the actual measure to be implemented.

In accordance with the IEPA's March 6, 1997 approval letter, the RFI Phase II/III Report will contain the information and conclusions outlined in the Draft Memorandum.

#### **IV.B Initial Corrective Measures Program Report (December 1995)**

##### Illinois EPA Evaluation of Soil and Groundwater Investigation Results

Following a listing of the four SWMUs associated with the highest levels of soil contamination, the IEPA characterizes the distribution of detected constituents as random. We believe that this characterization is inaccurate because distribution patterns are dependent on the constituent in question. The majority of the organic COCs (i.e., VOCs and SVOCs) are associated with the former SWMUs, and are not randomly distributed. However, other COCs (i.e., metals and certain SVOCs) are randomly distributed, and are associated with bituminous, coking, and foundry wastes that are constituents of the fill materials used to construct the pier.

Of the monitoring wells shown on Attachment 9 of the Draft Memorandum associated with the former SWMU#10, only G-344 and G-348 are located within or near this area (southwestern corner of the former process area). Monitoring Wells G-343, G-347, and G-349 are located upgradient and along the eastern edge of the former process area. Because the wells are located upgradient from the process area and the former SWMUs, contamination detected in samples from these wells is likely from off-site. The location of these upgradient monitoring wells is discussed in Section 3.2.7 of the December 1995 ICMP Report, and shown on Tables 3-1, 3-5, and 3-6 of the December 1995 Phase I Supplemental RFI Work Plan. This off-site contamination needs to be considered when developing Cleanup Objectives for groundwater.

##### Illinois EPA Evaluation of Lake Calumet Sediment and Surface Water Investigation Results

No comments.



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#### Illinois EPA Evaluation of Proposed Corrective Measures

The ICMP suggests that containment around the facility or specific SWMUs may be the most effective corrective measure, and we believe that the additional suggestion that other corrective measures (i.e., capping, groundwater pump and treat) are needed to reduce the toxicity of soil and groundwater contamination are supplemental to the containment remedy. Any structure designed to contain the fill material will extend into the underlying native clay layer, and a system to control infiltration may be needed. Capping to reduce infiltration was described in Section 5.3.1 of the December 1995 ICMP Report, and a low volume groundwater pump and treat system was also described in that section of the ICMP.

Based upon the following, we believe that it may be premature to suggest that activities associated with hot spot removal be implemented (i.e., confirmation sampling):

- o Tier 3 Cleanup Objectives may be higher than Tier 2 SLs. These levels, will be evaluated during the Phase I CMP;
- o Hot-spot removal may have limited effectiveness considering that containment with a capping system is a likely corrective measure;
- o Use of Tier 2 SLs for the SWMUs located on the pier area of the former CWM-CS site will likely show exceedances for a significantly large volume of material. Removal of this material would be impractical, and the costs would be prohibitive.

It is likely that a Tier 3 evaluation would be appropriate presuming a containment remedy that includes a capping system is implemented. Modifications to the Tier 2 parameters, a formal risk assessment, and consideration of incomplete exposure routes (Title 35 Ill. Adm. Code Section 742.805, 742.815, and 742.825, respectively) are means to establish Tier 3 Cleanup Objectives. Consequently, hot spot removal may not be needed.

#### Illinois EPA Evaluation of the GMZ Application

We agree that a ground water management zone (GMZ) for the site as a whole may be necessary in the future.

The application for a GMZ was included in the ICMP for the CWM-CS site only. The requirements of the various regulations that concern this application conflict in terms of timing. The Revised RCRA Part B





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Permit required that this application be submitted with the ICMP. However, as interpreted in the Draft Memorandum, Title 35 Ill. Adm. Code Section 620.250 requires that corrective measure(s) must be implemented prior to an IEPA determination of adequacy. Such an implementation, according to the Revised RCRA Part B Permit, would be during Phase IV of the CMP. Also, relative to the timing requirements of the Permit, a three dimensional volume for the GMZ would not be confirmed until approval of the Phase II CMP (Conceptual Design). This conflicts with the statement made in the Draft Memorandum which suggests that a new GMZ application be submitted once corrective measures(s) have been developed (Phase I CMP).

#### Illinois EPA Conclusions and Recommendations

In general, but subject to the comments immediately below, we agree with the IEPA's conclusions and recommendations.

We agree that a new GMZ application that includes both sites should be submitted. As previously pointed out, based on the regulatory requirements, the timing for this application is unclear. If the application is made when the CMP is submitted, the Phase II CMP would be the appropriate time. However, if implementation of the CMP is required, the Phase IV CMP would be the appropriate time. This issue must be addressed. Based on our understanding of the intent of the regulations, we believe that the GMZ application for the site as a whole should be made with the Phase II CMP submittal.

The following are comments concerning the additional requirements (a. through f.) proposed by IEPA to be included in the Phase I CMP Work Plan:

- a. The samples from the borings and monitoring wells (G-343, G-347, and G-349) located along the eastern portion of the former process area yielded metals concentrations in exceedance of Tier 1 Soil Cleanup Objectives, and yielded VOC, SVOC, and metals concentrations in exceedance of Tier 1 Groundwater Cleanup Objectives. In the case of groundwater, these wells are located upgradient from the process area. Consequently, the likely containment corrective measure would include this area. Additionally, waste management activities were not located over this portion of the facility. Based on these factors, it is not clear what objective would be reached by additional investigation over the eastern edge of the former process area.



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- b. It would be excessive to calculate remediation objectives for each possible corrective measure. The level of complexity would exponentially increase for combinations of corrective measures when considering the Tier 1, 2 and 3 calculations that would be required. A more reasonable approach would be to establish a set of Tier 1, 2, and 3 Cleanup Objectives that considers the presumed containment corrective measure. Then, various containment options can be evaluated for effectiveness at meeting these objectives.
- c. The various containment options can be evaluated for the long-term feasibility of meeting the single set of cleanup objectives described above.
- d. The IEPA is requesting additional analysis for data already available in the February 1995 RFI Report. Laboratory and field derived hydraulic conductivity values for the fill were presented in Appendix H and G of that Report, and results from the fill and clay layers were included. An analysis of these results is provided in Section 2.2.3.1 of the RFI Report.
- e. We already have information on the clay beneath the former CWM-CS site, and the Phase II/III Workplan was approved by the Agency without a request for this type of information beneath the original Clean Harbors facility. Given the depositional nature of the lacustrine clay layer, the lateral continuity of this layer across site is anticipated. We acknowledge that to confirm this at the original Clean Harbors site, additional borings may have to be advanced through the clay and till layers.

During the Phase II RFI Investigation on the former CWM-CS portion of the facility, boring samples from the clay layers beneath the most contaminated SWMUs in the ICMP Report were collected and analyzed for contaminants and permeability information. Field hydraulic conductivity measurements were performed on temporary piezometers located within or near the SWMU#1 (C-2P, C-2RP, C-3P, and C-6P). Additionally, laboratory permeameter measurements were performed on samples from borings within or near the SWMU#1 (C-2R, C-3, and C-4), near the SWMU#4 (C-7), within the SWMU#6 (C-1), and within the SWMU#10 (C-5). We believe that these investigation results were sufficient to evaluate the effectiveness of the clay layer as a barrier, and no further investigation is necessary.

- f. We believe that it is very likely that the data currently available for the CWM-CS site inorganic contaminant concentrations in the fill soils will be sufficient to allow a prescriptive or other statistical approach (ref. Sections 742.305(b)(1), and



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742.305(b)(3), respectively) to determine background concentrations for this area.

#### **IV.C Phase I Supplemental RCRA Facility Investigation Work Plan (December 1995)**

The following are comments concerning the revised goals of the Supplemental RFI:

- a. As stated previously in commenting on Item a. of the IEPA Conclusions and Recommendations regarding the ICMP portion of Section IV.B, the samples from the borings and monitoring wells (G-343, G-347, and G-349) located along the eastern portion of the former process area yielded metals concentrations in exceedance of Tier 1 Soil Cleanup Objectives, and yielded VOC, SVOC, and metals concentrations in exceedance of Tier 1 Groundwater Cleanup Objectives. In the case of groundwater, these wells are located upgradient from the process area, and waste management activities were not located over this portion of the facility. Based on these factors, it is not clear what objective would be reached by additional investigation over the eastern edge of the former process area.
- b. The close proximity of the process area to the former SWMU#10, and the soil and groundwater contamination immediately south of the former SWMU#1, would likely preclude a separate containment for the process area. This issue will, however, require further evaluation.
- c. As stated previously in our comment on the IEPA Evaluation of Proposed Corrective Measures portion of Section IV.B above concerning hot spot removal, we believe that it may be premature to suggest that activities associated with hot spot removal be implemented. It is likely that a Tier 3 evaluation would be appropriate presuming a containment remedy that includes a capping system is implemented. Modifications to the Tier 2 parameters, a formal risk assessment, and consideration of incomplete exposure routes are means to establish Tier 3 Cleanup Objectives. Consequently, hot spot removal may not be needed.

It would be advantageous to address the CMP over the entire facility, thereby eliminating the artificial boundary between the three areas. It is also recommended that the Revised Supplemental Work Plan be incorporated into the Phase I Corrective Measures Program Work Plan for the entire site.



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## **V. Additional Groundwater Issues**

Most of the issues referred to in this section have already been addressed in our previous comments. Issue 6, the characterization of off-site upgradient groundwater contaminant migration, should be evaluated relative to the likely containment remedy. If containment around the perimeter of the facility is part of the final corrective measures, then future upgradient groundwater impacts will not affect the contained area.

## **VI. Conclusions and Recommendations**

### **VI.1 The RCRA Facility Investigation Phase II/III Work Plan, May 1996 (for the original portion of the facility)**

The combined RFI Phase II/III activities are currently underway, and an RFI Phase II/III Report summarizing these activities is scheduled to be submitted to the IEPA by November 1997. Upon completion of the RFI Phase II/III Report, we will be able to provide the information requested by the IEPA in this section.

### **VI.2 The Initial corrective Measures Program Final Report, December 1995 (for the former CWM-CS portion of the facility)**

The language used in this portion of the Draft Memorandum suggests that the timing of the future GMZ application would be with submittal of the Phase II CMP, and would likely include the original Clean Harbors portion of the facility. We agree that this would be the most appropriate timing. However, language, used in prior sections of the Memorandum, which refer to implementation of the corrective measure as the appropriate timing for a GMZ application, conflicts with this timing. This should be clarified with the Agency.

The additional requirements for the Phase I CMP Work Plan (a-f) are the same as those stated in Section IV.B., IEPA Conclusions and Recommendations, and are responded to in that section. These additional requirements are either unclear as to their rationale relative to the likely containment remedy, impractical to implement, or redundant based on existing data.



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**VI.3 The Phase I Supplemental RFI Work Plan, December 1995 (for the process area located at the former CEM-CS portion of the facility)**

The revised goals (a. through c.) are the same as those stated in Section IV.C, and are responded to in that section. The goals do not appear to recognize the implications associated with the Likely containment remedy, or are impractical to implement.

**VI.3.1 Through VI.3.4 Corrective Measures Program**

It is noted that an ecological assessment is listed as a requirement of Phase II of the Corrective Measures Program. We point out that an Ecological Risk Assessment was prepared by Dames & Moore in 1994, and it may be possible to simply update or revise this report to satisfy this IEPA requirement.

While we agree that containment is an effective option, the feasibility of several additional alternatives needs to be addressed prior to selecting the preferred alternative. Factors such as costs, time frames and actual risks need to be thoroughly investigated and compared.

The following comments address the IEPA Phase II - V CMP requirements contrasted with those already shown in Attachment K of the RCRA Part B Permit:

- o A plan for hot spot removal has been included in the IEPA requirements for the Phase II Program. The Permit specifies that identification and selection of corrective measures will be made in the Phase II Program. This requires an analysis and comparison of options at that time, not a selection prior to this determination.
- o The Ecological Assessment shifted to Phase II from Phase I, along with specific language regarding potential impacts to surface waters of Lake Calumet. The Permit requires an ecological assessment, regardless of the remedy and includes a requirement to analyze potential exposure pathways. By requiring the ecological assessment in the Phase II Program it will not be available for use in developing cleanup objectives, as required in the Permit. The cleanup objectives are developed in the Phase I Program.
- o The Application to establish a GMZ is shifted from ICMP submittal to Phase II. This appears appropriate considering the combining of sites under the future program.



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- o The IEPA requirements for the Phase III - V Programs are parallel to those in the Permit. These requirements are the same as those in the Permit, but are not inclusive of all the requirements detailed in the Permit.

If you have any questions regarding the foregoing comments on the Draft Memorandum, please do not hesitate to contact me.

Very truly yours,

A handwritten signature in black ink, appearing to read 'Jules B. Selden', written over a horizontal line.

Jules B. Selden  
Senior Counsel

cc: Valerie A. Farrell - Carlson Environmental  
David Trainor - Dames & Moore  
Brian J. Clarke, Esq. - CWM  
James R. Laubsted - CH



State of Illinois

# ENVIRONMENTAL PROTECTION AGENCY

From

USEPA

Mary A. Gade, Director

2200 Churchill Road, Springfield, IL 62794-9276

217/524-3300

March 6, 1997

CERTIFIED MAIL  
Z 363 621 194

Jules B. Selden, Esq. - Law Department  
Clean Harbors Environmental Services, Inc.  
1501 Washington Street  
P.O. Box 850327  
Braintree, Massachusetts 02185-0327

Re: 0316000051 -- Cook County  
Clean Harbors Services, Inc.  
ILD000608471  
Dates Received: May 6, 1996 and December 9, 1996  
Log No. B-16-CA-2  
RCRA Permit

Dear Mr. Selden:

The RCRA Facility Investigation (RFI) Combined Phase II/III Work Plan for a portion of the Clean Harbors Services, Inc. facility which you submitted has been reviewed by Illinois EPA. The Work Plan was submitted in accordance with the Illinois EPA's January 31, 1996 letter (Log No. B-16-CA-1) to meet the corrective action requirements of Conditions V.B.6 and V.B.10 of the revised RCRA Permit issued to Clean Harbors on June 30, 1995 (Log Nos. B-16-M-2 and B-16-M-4).

In accordance with the January 31, 1996 Illinois EPA letter, the subject Work Plan addresses RFI Phase II and III activities for the solid waste management units (SWMUs) and areas of concern (AOCs) located at the 11800 South Stony Island Avenue portion of the Clean Harbors facility. The goals of these activities will be to determine: (1) the nature and potential extent of soil contamination identified during Phase I of the RFI; and (2) the nature of releases, if any, to both on-site and off-site groundwater.

The RFI Combined Phase II/III Work Plan is hereby approved subject to the following conditions and modifications:

1. The subject Clean Harbors facility is composed of two areas which have been addressed independently relative to RCRA corrective action. These areas are: (1) the original Clean Harbors facility located at 11800 South Stony Island Avenue (original portion); and (2) the

former CWM Chemical Services incinerator facility located at 11700 South Stony Island Avenue (former CWM Chemical Services portion). The subject RFI Phase II/III Work Plan proposes activities to investigate the following SWMUs located at the original portion of the Clean Harbors facility:

<u>SWMU No.</u>	<u>Name</u>
7	Chlorobenzene Contaminated Area
8	Auxiliary Basin No. 3
9	Landfill
10	Former Temporary Pickle Liquor Basins
11	Former Permanent Pickle Liquor Disposal Sites
12	Former Permanent Pickle Liquor Basins
13	Former Oil Basin
16	Tanks 1-4

<u>AOC No.</u>	<u>Name</u>
1	Northern Portion of Process Building No. 1
2	Southern Portion of Process Building No. 1

2. At this time, RFI activities have been completed and an Initial Corrective Measures Program Report has been prepared for the former CWM Chemical Services portion of the Clean Harbors facility. It is the IEPA's opinion that upon completion of the Phase II/III RFI it will be possible to make an initial determination regarding the probable corrective measure(s) that may be necessary to address contamination at the original portion of the Clean Harbors facility. In all likelihood, it will be most effective to address the entire Clean Harbors facility under one Corrective Measures Program at that time. For this reason, an additional goal of this Phase II/III RFI should be to make an initial determination regarding the probable corrective measure(s) that may be necessary at the original portion of the Clean Harbors facility. Therefore, an evaluation of possible corrective measures and an initial recommendation should be included in the RFI Phase II/III Report required by Condition 3 below.
3. RFI Phase II/III field activities should be completed by September 1, 1997. When Phase II/III of the RFI is complete, the owner or operator must submit certification meeting the requirements of 35 Ill. Adm. Code 702.126 by a responsible officer of the owner or operator and by an independent professional engineer that Clean Harbors has completed Phase II/III of the RFI in accordance with the specifications in the approved RFI Phase II/III Work Plan. In addition, a certification statement meeting the requirements of 35 Ill. Adm. Code 702.126 must be provided by a responsible officer of the laboratory which conducted the chemical analysis. This laboratory certification should address the applicable sample collection, preservation, handling, and analytical requirements set forth



in this letter. These certifications should be received at the Illinois EPA by November 1, 1997. These dates may be revised if Clean Harbors provides information to the Illinois EPA that it is attempting to complete the required activities in a timely manner but needs additional time to complete the investigation.

The attached certification forms should be used. Signatures must meet the requirements of 35 Ill. Adm. Code 702.126. The independent engineer should be present at all critical, major activities during the RFI. These activities might include decontamination activities, integrity inspections, soil sampling, soil removal, backfilling, etc. The frequency of inspections by the independent engineer must be sufficient to determine the adequacy of each critical activity.

The Illinois Professional Engineering Act (Ill. Rev. Stat., Ch. 111, par. 5101 et. seq.) requires that any person that practices professional engineering in the State of Illinois or implies that they are a professional engineer must be registered under Illinois Professional Engineering Act (par. 5101, Sec. 1). Therefore, any certification or engineering services which are performed for an RFI in the State of Illinois must be done by a registered Illinois P.E.

Plans and specifications, designs, drawings, reports and other documents rendered as professional engineering services, and revisions of the above must be sealed and signed by a professional engineer in accordance with par. 5119, Sec. 13.1 of the Illinois Professional Engineering Act.

As part of the certification, to document the RFI Phase II/III activities completed at Clean Harbors, an RFI Phase II/III Report should be submitted with the certifications which includes the following:

- a. Information documenting soil sampling/analysis efforts including:
  1. A discussion of the reasons for and the goals of the sampling efforts conducted at each SWMU;
  2. Scaled drawings showing the horizontal and vertical location where all soil samples were collected at each SWMU;
  3. A description of the procedures used for sample collection, preservation, chain-of-custody, and decontamination of sampling equipment;
  4. Visual classification of each soil sample collected and a discussion of soil types encountered during the investigation, including scaled cross-sections;

5. A description of procedures used to analyze soil samples, including: (1) analytical and sample preparation procedures, (2) any dilutions made to the samples, (3) any interferences encountered during sample analysis, and (4) the practical quantitation limits (PQLs) achieved, including justification for reporting PQLs above those set forth in SW-846;
  6. A description of all quality control/quality assurance efforts made, including analysis of lab blanks, trip blanks, field blanks, and duplicate samples;
  7. A summary of all data, including QA/QC results, in tabular form;
  8. Copies of final laboratory sheets reporting results of all analyses; and
  9. A discussion of the collected sampling/analysis data. This discussion should identify those sample locations where contaminants were detected and the concentrations of the contaminants at those locations. Conclusions which can be drawn should also be included in this discussion.
- b. Information specified in Condition 11 below to document the proposed groundwater investigation;
  - c. Information which the Work Plan indicates will be in the report;
  - d. A chronological summary of Phase II/III activities and costs involved. The summary of costs should also include all costs associated with Phase II/III of the RFI;
  - e. Color photo documentation of Phase II/III activities, including decontamination activities, soil sampling, well installation, groundwater sampling, soil removal, backfilling, etc.;
  - f. Conclusions and recommendations regarding the RFI and future implementation of any corrective measures;
  - g. A discussion of activities which should be carried out during the next phase of the RCRA Facility Investigation and/or any corrective action activities which should be carried out.

The original and two (2) copies of all certifications, logs or reports which are required to be submitted to the IEPA by the facility should be mailed to the following address:

Illinois Environmental Protection Agency  
Bureau of Land -- #33  
Permit Section  
2200 Churchill Road  
Post Office Box 19276  
Springfield, Illinois 62794-9276

4. If the IEPA determines that implementation of this RFI Work Plan fails to satisfy the requirements of Section V of the revised RCRA Permit issued to Clean Harbors, the Illinois EPA reserves the right to require that additional work be completed to satisfy these requirements. Revisions of RFI work plans are subject to the appeal provisions of Section 40 of the Illinois Environmental Protection Act.
5. The soil sampling/analysis plan proposed in Section 4.0 of the Phase II/III Work Plan is acceptable. For the most part, the analytical parameters proposed at each of the SWMUs and AOCs are acceptable, but because of the recent implementation of a tiered approach to determining corrective action objectives by the Illinois EPA, the total concentrations of some inorganic parameters and the soil pH should be determined instead of TCLP concentrations. A copy of the proposed 35 Ill. Adm. Code 742 - Tiered Approach to Corrective Action Objectives (TACO) rules is included as an attachment to this letter. The following table summarizes whether TCLP and/or total concentrations of the proposed inorganic parameters should be determined:

Inorganic Constituent	TCLP Analysis	Total Analysis	Inorganic Constituent	TCLP Analysis	Total Analysis
Antimony	Yes	Yes	Chromium (+6)	No	Yes
Arsenic	No	Yes	Cyanide	Yes	Yes
Barium	No	Yes	Lead	No	Yes
Beryllium	No	Yes	Nickel	No	Yes
Cadmium	No	Yes	Silver	Yes	Yes
Chromium (total)	Yes	Yes	Zinc	No	Yes

It should be noted that the total concentrations of inorganic parameters and the soil pH should be determined wherever analysis for inorganic parameters is proposed in the Phase II/III Work Plan. Soil pH should be determined using SW-846 Method 9045 (soil and waste pH) so that cleanup objectives for inorganic parameters can be developed based on total concentrations where possible. Concentrations of both total and hexavalent chromium should be determined when analysis for chromium is carried out. Also, analysis for lead using TCLP procedures may be carried out if development of corrective action objectives for lead based on TCLP concentrations is desired.

6. All soil samples must be analyzed individually (i.e., no compositing). Analytical procedures should be conducted in accordance with Test Methods for Evaluating Solid Wastes, Third Edition (SW-846). When a SW-846 (Third Edition) analytical method is specified, all chemicals listed in the Quantitation Limits Table for that method should be reported unless specifically exempted in writing by this Illinois EPA. Apparent visually contaminated material within a sampling interval should be included in the portion of the sample to be analyzed. To demonstrate a parameter is not present in a sample, analysis results must show a detection limit at least as low as the PQL for that parameter in the third edition of SW-846. For inorganic parameters, the detection limit achieved during the analysis of the TCLP extract must be as low as the respective Class I groundwater standard.
7. The following procedures should be utilized in the collection of all soil samples:
  - a. The procedures used to collect the soil samples must be sufficient so that all soil encountered are classified in accordance with ASTM Method D-2488;
  - b. If a drill rig or similar piece of equipment is necessary to collect required soil samples, then:
    1. The procedures specified in ASTM Method D-1586 (Split Spoon Sampling) or D-1587 (Shelby Tube Sampling) must be used in collecting the samples; and
    2. Soil samples must be collected continuously at several locations to provide information regarding the shallow geology of the area where the investigation is being conducted.
  - c. All soil samples which will be analyzed for volatile organic compounds (VOCs) must be collected in accordance with the IEPA Soil Sampling Procedure For Volatile Organic Compounds provided as an attachment to this letter;
  - d. All other soil samples must be collected in accordance with procedures set forth in SW-846; and

- e. When visually discolored or contaminated material exists within an area or interval to be sampled, the visually contaminated or discolored portion of the sample should be included in the sample portion to be analyzed.
- 
- 8. Quality assurance/quality control procedures which meet the requirements of SW-846 must be implemented during all sampling/analysis efforts. In addition, sample collection, handling, preservation, preparation, and analysis must be conducted in accordance with the procedures set forth in SW-846 and any additional requirements set forth in this letter.
  - 9. In order to make an initial evaluation of the necessity and effectiveness of specific corrective measures which may be carried out at the original portion of the Clean Harbors facility, Tier 2 corrective action objectives should be calculated for the site in accordance with the proposed 35 Ill. Adm. Code 742 rules. In order to complete the Tier 2 analysis for the site, it will be necessary to determine several site specific soil parameters such as: soil bulk density, soil particle density, moisture content, fraction organic carbon, fraction vegetative cover, hydraulic conductivity, hydraulic gradient, etc. As a result, these parameters should be determined during the Phase II/III RFI. Guidance for the Tier 2 analysis is provided in the proposed 35 Ill. Adm. Code 742 rules provided as an attachment to this letter. The actual Tier 2 corrective action objectives may be developed and included in the RFI Phase II/III Report required by Condition 3 above, or development of these objectives may be deferred until the Phase I Corrective Measures Program Work Plan so that the objectives will be applicable to the entire Clean Harbors facility. If Tier 2 corrective action objectives are included in the RFI Phase II/III Report, then a detailed discussion of how these objectives were developed and sample equations should be included in the report.
  - 10. It was indicated in Section 3.1.1 of the Phase II/III Work Plan that previous investigations of the Chlorobenzene Contaminated Area (SWMU No. 7) have been carried out. Results of these investigations should be provided in the Phase II/III RFI Report required by Condition 3 above. Information which should be provided includes, but is not limited to:
    - a. A summary of previous soil sampling/analysis results;
    - b. Depths from which soil samples were collected;
    - c. A drawing showing the approximate horizontal locations where soil samples were collected; and
    - d. A general description of procedures used to collect and analyze soil samples, including a discussion of analytical and sample preparation procedures and quality control procedures.

11. The groundwater investigation plan proposed in the Phase II/III Work Plan is approved subject to the following conditions and modifications:
  - a. In consideration of the Phase I soil sampling activities and results, the proposed monitoring well installation locations, as depicted in Figure Three - Proposed Sampling Locations, should be sufficient to determine if groundwater at the facility has been impacted;
  - b. The Illinois EPA recommends that purging should continue until water chemistry parameters monitored during purging level off at stable values. Specifically, purging should continue until measurements of turbidity, redox potential, and dissolved oxygen have stabilized within approximately 10% over two consecutive measurements. If the well sufficiently recharges, a minimum of three well volumes should be removed, and no more than 10 well volumes should be removed;
  - c. Geologic logs should be completed by a qualified geologist for each monitoring well/piezometer boring. An Illinois EPA boring log (provided as an attachment) or one which has been approved by the Illinois EPA should be used to log borings;
  - d. The construction and development of groundwater monitoring wells/piezometers should be documented on well completion diagrams. An Illinois EPA well completion diagram (provided as an attachment) or one which has been approved by the Illinois EPA's Permit Section should be used to document well construction and development; and
  - e. The groundwater quality constituents of 35 Ill. Adm. Code 620, Subpart D should be appended to the proposed analytical parameter list (35 Ill. Adm. Code 724, Appendix I). Additionally, the analytical methods specific to the analysis of each constituent should be identified in the Phase II/III report. The analytical method utilized to determine the concentration of those constituents of 35 Ill. Adm. Code 620, Subpart D must allow the detection of that constituent at or below its concentration standard.
12. All wastes generated and/or derived from the RFI investigations at the site (e.g., auger cuttings, decontamination wash and rinsates, monitoring well purge water, etc.) meet the definitions of Pollution Control Waste and Industrial Waste in accordance with 35 Ill. Adm. Code 809, and therefore are subject to regulation as Special Wastes. Clean Harbors must collect these wastes for adequate characterization to determine if these wastes are listed or characteristically hazardous, including a determination whether these wastes are "derived from" hazardous wastes. If it is determined that these wastes are indeed hazardous, they must be managed in accordance with the requirements of 35 Ill. Adm. Code Subtitle G. If these wastes are determined to be non-hazardous, they must be managed as a special waste in accordance with 35 Ill. Adm. Code Subtitle G requirements.

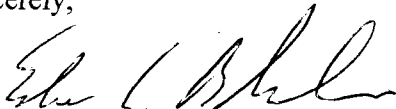
13. The Site Health and Safety Plan contained in Attachment C of the Phase II/III Work Plan is neither approved or disapproved. Under the provisions of 29 CFR 1910 (51 FR 15,645, December 19, 1986), cleanup operations must meet the applicable requirements of OSHA's Hazardous Waste Operations and Emergency Response standard. These requirements include hazard communication, medical surveillance, health and safety programs, air monitoring, decontamination, and training. General site workers engaged in activities that expose or potentially expose them to hazardous substances must receive a minimum of 40 hours of safety and health training off site plus a minimum of three days of actual field experience under the supervision of a trained experienced supervisor. Site managers and supervisors must have at least an additional eight hours of specialized training on managing hazardous waste operations.
14. Quarterly reports should be prepared and submitted to the IEPA which describe the activities completed each quarter of the calendar year while the RFI Phase II/III investigation is being carried out. At a minimum, the quarterly reports should contain:
  - a. A summary of activities completed during the reporting period;
  - b. An estimate of the percentage of the investigation completed;
  - c. A summary of all actual or proposed changes in the Work Plan or its implementation;
  - d. A summary of all actual or potential problems encountered during the reporting period;
  - e. Proposal(s) for correcting any problems encountered;
  - f. Projected work for the next period; and
  - g. Other information or data as requested by the IEPA.

A quarterly report for work completed from the date of this letter to March 31, 1997 (the portion of the first quarter of the current calendar year during which the required Phase II/III investigation is taking place) should be submitted to the IEPA by May 1, 1997. Subsequent quarterly reports should be submitted similarly until the final RFI Phase II/III report is submitted to the Illinois EPA.

Clean Harbors Services, Inc.  
Log No. B-16-CA-2  
Page 10

Should you have any questions regarding the groundwater aspects of this letter, please contact Ron Hewitt at 217/524-3861; questions regarding other aspects of this project should be directed to Tom Fiersten at 217/524-3311.

Sincerely,



Edwin C. Bakowski, P.E.  
Manager, Permit Section  
Bureau of Land

ECB:TFF\mfs\973381S.WPD  
*SV M Etk*

Attachments: RFI Phase II/III Certification Statement  
Laboratory Certification Statement  
IEPA Soil Sampling Procedure For Volatile Organic Compounds  
Proposed 35 IAC 742 Tiered Approach to Corrective Action Objectives Rules  
Illinois EPA Boring Log  
Illinois EPA Well Completion Diagram

cc: USEPA Region V - Hak Cho





**ENVIRONMENTAL SERVICES, INC.**

1501 WASHINGTON STREET, PO BOX 850327-BRAINTREE, MA 02185-0327  
(617) 849-1800

RFI INFO.

WRITER'S DIRECT NUMBER

Extension 4182

LAW DEPARTMENT

(617) 849-1800

FAX (617) 356-1375

VIA FIRST CLASS MAIL

July 22, 1996

Illinois Environmental Protection Agency  
Attn: Edwin C. Bakowski, Manager  
Permit Section, Bureau of Land  
2200 Churchill Road  
Springfield, Illinois 62794-9276

Re: 0316000051 - Cook County  
✓ Clean Harbors of Chicago, Inc.  
ILD000608471  
Log No. 16  
RCRA Permit

JUL 23 1996

Dear Mr. Bakowski:

On July 11, 1996, Mr. Thomas Fiersten of your staff called me and requested some additional information to assist with his review of the Initial Corrective Measures Program (CMP) Report for the former CWM incinerator site which was submitted to the Agency on December 4, 1995. Specifically, Mr. Fiersten requested (1) a table showing sample depths for the fill samples collected from SWMU's #1, #3, #4, #5, #6 and #10 during Phases I and II of the RFI, and (2) tabulated data of Lake Calumet sediment and surface water data. This correspondence responds to Mr. Fiersten's request.

Rather than create a new table showing sample depths for all fill samples, certain CMP Report tables were revised by inserting a new row containing the requested information. Attached hereto as Attachment A please find revised Initial CMP Report Tables 2-4A, 2-4B, 2-4C, 2-5A, 2-5B, 2-7, 2-9A, 2-9B, 2-12, 2-16A, 2-16B, 2-20 and 2-21.

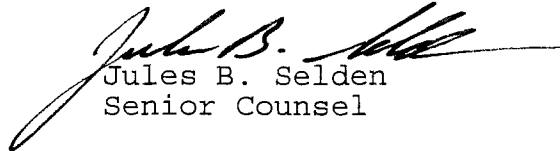


Illinois Environmental Protection Agency  
July 22, 1996  
Page 2

Rather than create new tables with Lake Calumet sediment and surface water sampling results, we reprinted certain tables from the Final CWMCS RFI Report which contained this data. Attached hereto as Attachment B are said Tables 4-30, 4-31, 4-32, 4-33, 4-34, 4-35, 4-36 and a map from the report showing the sample locations.

If you have any questions, please do not hesitate to contact me.

Very truly yours,



Jules B. Selden  
Senior Counsel

Attachments

cc: David Trainor - Dames & Moore  
James R. Laubsted - CHCI (enc)  
Rick Kiernan (enc) - CHESI (enc)  
Brian J. Clarke, Esq. - CWM (enc)

**ATTACHMENT A**  
**RFI FILL SAMPLE RESULTS**  
**WITH SAMPLE DEPTHS**

**Table 2-4A**  
**Phase I RFI Soil Sample Results - SWMU #1**

Constituent	B306F1	B306F2	B312F1	B312F2	B313F1	B313F2	B315F1	B315F2	B331F1	B331F2	B333F1	B333F2
<i>Depth (ft.)</i>	<i>8 - 10</i>	<i>12 - 14</i>	<i>8 - 10</i>	<i>12 - 14</i>	<i>10 - 12</i>	<i>14 - 16</i>	<i>8 - 10</i>	<i>12 - 14</i>	<i>8 - 10</i>	<i>12 - 14</i>	<i>6 - 8</i>	<i>12 - 14</i>
Acenaphthene			390		591					19,900	3,970	867
Acenaphthylene											4,790	1,410
Anthracene			605		5,610	250			7,900	55,700	7,330	2,130
Benzene	320	120	2.3	1.9	16	6		10		3,800	573	25.9
Benzo(a)anthracene			1,200	500	2,140	500			15,000	101,000		4,710
Benzo(b)fluoranthene			2,350	800	3,720	470			22,100	80,400		3,200
Benzo(ghi)perylene			990						8,700	51,100		653
Benzo(k)fluoranthene					420	290				14,800		
Benzo(a)pyrene			1,380	450	2,240	390			12,800	83,000		2,780
Bis(2-ethylhexyl)phthalate	460	670	990	370	26,100	1,700	350	700				460
Chlorobenzene					79.5							
Chloroform	140	47			1.3							
Chrysene			1,370	480	2,140				14,400	93,800		2,440
Dibenzo(a,h)anthracene										9,500		430
Di-n-butyl phthalate	4,680	4,640	1,100		1,200	590	1,400	1,300		3,800		
1,2-Dichlorobenzene(o)					490							
1,1-Dichloroethane					1.0	2.9						
1,1-Dichloroethylene	22,500	7,820	3.31	5.11	25.1	144	7.25	8.8	6,650	28,700	31.9	13.6
Di-n-octyl phthalate		940				840		4,290				
Endosulfan I						748						
Endosulfan sulfate						46.1						
Ethylbenzene					15.8						88.8	2.4
Fluoranthene			2,650	1,210	4,240	937			30,600	248,000	9,430	3,970
Fluorene			430		907	250			5,100	27,900	9,210	2,180
Heptachlor						13.8						
Indeno(1,2,3-c,d)pyrene			360						3,500	21,500		460
Methylene chloride	44500	2850	140	220	68.8	174	98.1	205	22300	21000	141	59.1

**Table 2-4A**  
**Phase I RFI Soil Sample Results - SWMU #1**

<b>Constituent</b>	<b>B306F1</b>	<b>B306F2</b>	<b>B312F1</b>	<b>B312F2</b>	<b>B313F1</b>	<b>B313F2</b>	<b>B315F1</b>	<b>B315F2</b>	<b>B331F1</b>	<b>B331F2</b>	<b>B333F1</b>	<b>B333F2</b>
<i>Depth (ft.)</i>	<i>8 - 10</i>	<i>12 - 14</i>	<i>8 - 10</i>	<i>12 - 14</i>	<i>10 - 12</i>	<i>14 - 16</i>	<i>8 - 10</i>	<i>12 - 14</i>	<i>8 - 10</i>	<i>12 - 14</i>	<i>6 - 8</i>	<i>12 - 14</i>
Naphthalene	160				1,830						20,300	6,740
Phenanthrene			2,880	1,300	5,210	1,190			33,800	226,000	27,100	7,720
Pyrene			2,160	968	3,710	886			22,900	218,000	27,100	4,650
Tetrachloroethylene					13.5							2.1
Toluene	250	140			49	3.8			1,000	2,300	657	23.4
1,2-Trans-dichloroethylene	238	54	2.44		1.4	1.4						
1,1,1-Trichloroethane		49	3.7	2.1								
1,1,2-Trichloroethane	180	110	14.1	10.2	23.6				22,300	12,000		
Trichloroethylene	305	90			6.34							4.21
Trichlorofluoromethane			7.3	5.4								2.1
Vinyl Chloride			16.2	12.5		66.8				15,000		
<b>Ionizable Organics</b>												
2-Chlorophenol						700						
2,4-Dichlorophenol	9,790	910			1,120	490	380					
4-Nitrophenol			1,370									
Phenol	6,050								56,500	18,600	6,090	2,090
<b>Inorganics</b>												
Antimony	4,200	13,000			9,300	8,200	8,500	5,900			18,000	4,800
Arsenic	68,000	7,900	16,000	8,000	6,300	9,200	67,000	18,000	6,400	530	9,900	8,000
Beryllium	2,100	440	680	460	770	630	1,800	1,000	410	410	810	520
Cadmium	1,300						2,100	890	4,000	170	590	190
Chromium	41,000	16,000	19,000	15,000	13,000	19,000	43,000	25,000	14,000	12,000	61,000	16,000
Copper	22,000	16,000	44,000	26,000	32,000	20,000	28,000	16,000	33,000	46,000	51,000	13,000
Lead	22,000	8,000	79,000	17,000	95,000	25,000	33,000	30,000	330,000	360,000	130,000	77,000
Mercury	54	41	180		160	51			390	530	280	71
Nickel	19,000	24,000	32,000	28,000	20,000	25,000	20,000	16,000	13,000	16,000	33,000	13,000
Selenium	4,400	200			1,100		4,200	1,100	240	350	1,700	540

**Table 2-4A**  
**Phase I RFI Soil Sample Results - SWMU #1**

Constituent	B306F1	B306F2	B312F1	B312F2	B313F1	B313F2	B315F1	B315F2	B331F1	B331F2	B333F1	B333F2
<i>Depth (ft.)</i>	<i>8 - 10</i>	<i>12 - 14</i>	<i>8 - 10</i>	<i>12 - 14</i>	<i>10 - 12</i>	<i>14 - 16</i>	<i>8 - 10</i>	<i>12 - 14</i>	<i>8 - 10</i>	<i>12 - 14</i>	<i>6 - 8</i>	<i>12 - 14</i>
Silver		390	340	290		260	350	270	350	540		
Thallium	3,500	690	610	640	330		3,800	1,100	400		580	340
Zinc	150,000	49,000	110,000	54,000	140,000	58,000	210,000	130,000	170,000	311,000	244,000	99,000

All units reported in  $\mu\text{g}/\text{kg}$  unless otherwise noted.

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**Table 2-4B**  
**Phase I RFI Soil Sample Results - SWMU #1**

Constituent	B339F1	B339F2	B340F1	B340F2	B341F1	B341F2	G305F1	G305F2	G307F1	G307F2	G314F1	G314F2
Depth (ft.)	6 - 9	10 - 12	4 - 6	8 - 10	4 - 6	10 - 12	8 - 10	14 - 16	8 - 10	12 - 14	8 - 10	12 - 14
Acenaphthene	210				3,220	437					396	400
Anthracene	576			1,100	5,810	488	310				755	504
Benzene	0.64	1.3	3.7	60	12,700	250	46		1.9		16	81.5
Benzo(a)anthracene	3,140	880			15,000	1,170	720				1,790	880
Benzo(b)fluoranthene		580		2,600	19,200	1,120	1,100		590		2,710	1,190
Benzo(k)fluoranthene	4,670	733			2,900				330		310	480
Benzo(a)pyrene	2,040	493		1,900	13,000	851	670				1,650	745
Bis(2-ethylhexyl)phthalate						300	900	1,400	3,600	380	2,250	380
Chloroform									1.5		0.74	
Chrysene	1,670	403			16,400	870	770		410			
4,4 DDD					22.3							
Di-n-butyl phthalate		360				280		3,150	3,510	4,830	880	720
1,2-Dichloroethane											5.76	
1,1-Dichloroethylene		2.1	2.5	227				15.3	5.49		4.1	280
Di-n-octyl phthalate									510		3,110	620
Ethylbenzene							70				3	
Fluoranthene	4,130	857		5,060	31,200	1,850	1,530		830		3,610	1,800
Fluorene					3,710	373					428	438
Indeno(1,2,3-c,d)pyrene					3,300							
Methylene chloride	47.9	81.1	30.9	472	81.6	118	478	328	167	126	30.8	414
Naphthalene	423	190	2,870		2,820	599					503	
Phenanthrene	2,450	680	1,800	4,200	22,400	1,920	1,600				3,070	2,170
Pyrene	3,090	671		5,100	28,400	1,560	1,210		837		3,020	1,610
Toluene	2.8	1.8	1.8	180	7.1	94	399		5.3	0.92	7.4	25
1,2 Trans-dichloroethylene							171				1.0	
1,1,2-Trichloroethane	1.8	3						21	17.2	6.68	21.4	384
Trichloroethylene		3.05										

**Table 2-4B**  
**Phase I RFI Soil Sample Results - SWMU #1**

Constituent	B339F1	B339F2	B340F1	B340F2	B341F1	B341F2	G305F1	G305F2	G307F1	G307F2	G314F1	G314F2
Depth (ft.)	6 - 9	10 - 12	4 - 6	8 - 10	4 - 6	10 - 12	8 - 10	14 - 16	8 - 10	12 - 14	8 - 10	12 - 14
Trichlorofluoromethane	2.6	2.3	1.2					8.8		1.3		
Vinyl Chloride											16.2	76
<b>Ionizable Organics</b>												
2,4-Dichlorophenol						210					837	1,610
Phenol			32,600	7,060								
<b>Inorganics</b>												
Antimony	20,000	19,000	12,000	5,600	21,000	22,000			9,300	6,500	17,000	8,000
Arsenic		13,000	31,000	25,000	27,000	26,000	7,800	3,500	5,900	6,500	8,600	17,000
Beryllium	2,300	2,300	2,000	1,400	2,000	2,000	300	450	160	180	580	170
Cadmium	1,700	1,000	4,300	3,800	4,200	4,000			330			170
Chromium	41,000	37,000	51,000	45,000	58,000	52,000	9,400	16,000	9,500	8,300	79,000	11,000
Copper	26,000	29,000	34,000	32,000	133,000	26,000	26,000	17,000	9,800	11,000	44,000	14,000
Lead	55,000	62,000	41,000	49,000	470,000	360,000	31,000	12,000	29,000	11,000	73,000	36,000
Mercury	140	78	140	130	490	140	84		78	52	40	93
Nickel	22,000	30,000	30,000	18,000	25,000	34,000	18,000	26,000	6,700	12,000	37,000	17,000
Selenium	2,500	1,900	2,600	3,300	2,100	2,800	340		340		300	280
Silver			1,900	3,100							280	
Thallium	2,100	1,800	2,000	2,200	1,500	2,500	520				990	980
Zinc	230,000	19,000	210,000	190,000	493,000	656,000	59,000	48,000	52,000	39,000	190,000	130,000

All units reported in µg/kg unless otherwise noted.

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<p align="center"><b>Table 2-4C</b> <b>Phase I RFI Soil Sample Results - SWMU #1</b></p>										
<b>Constituent</b>	<b>G330F1</b>	<b>G330F2</b>	<b>G332F1</b>	<b>G332F2</b>	<b>G334F1</b>	<b>G334F2</b>	<b>P323F1</b>	<b>P323F2</b>	<b>P329F1</b>	<b>P329F2</b>
<i>Depth (ft.)</i>	<i>8 - 10</i>	<i>12 - 14</i>	<i>8 - 10</i>	<i>12 - 14</i>	<i>6 - 9</i>	<i>12 - 15</i>	<i>6 - 8</i>	<i>12 - 14</i>	<i>8 - 10</i>	<i>14 - 16</i>
Acenaphthene	285	452	1,160				4,330		1,120	520
Acenaphthylene	87	77	600							
Anthracene	1,010	1,530	2,220	664	370		11,100		1,970	854
Benzene	10	115	3.7	746			4.3	2.2	7.9	2.7
Benzo(a)anthracene	3,500	3,580	3,160	1,100			20,000		4,140	1,300
Benzo(b)fluoranthene	2,050	2,010	2,840	1,670			29,100		6,650	2,000
Benzo(ghi)perylene	2,830	2,700	1,660	630					610	
Benzo(k)fluoranthene	1,800	2,050	530				3,150		3,600	
Benzo(a)pyrene	2,780	2,910	2,830	1,070			17,100		1,280	1,140
Bis(2-ethylexyl)phthalate	1,750	3,370	1,700	720		2,130	6,690	650	910	460
Chlorobenzene				336						
Chloroform			1.1				1.1	2	4.5	
Chrysene	3,160	3,180	3,000	1,120			19,200		4,130	1,390
DDD									20	
DDE	29									
Dibenzo(a,h)anthracene									770	
Di-n-butyl phthalate	320	550	1,000	800	800	290	4,530	8,870	2,200	760
1,1-Dichloroethylene	62.2	131	7.83	1060			9.64	7.62	12	5.1
Dieldrin	31.1									
Di-n-octyl phthalate							310		770	
Ethylbenzene		16		130						
Fluoranthene	6,170	6,880	6,830	2,700	1,030		42,300		9,300	3,000
Fluorene	414	606	2,250	635			5,880		1,440	755
Indeno(1,2,3-c,d)pyrene	969	956	710	250					1,300	280
Methylene chloride	144	391	297	1,920	82.4	22.4	240	215	290	149
Naphthalene	1,030	1,110	6,220				3,500		3,740	
Phenanthrene	3,660	6,360	9,540	3,550	420		38,500		9,110	4,000

Table 2-4C Phase I RFI Soil Sample Results - SWMU #1										
Constituent	G330F1	G330F2	G332F1	G332F2	G334F1	G334F2	P323F1	P323F2	P329F1	P329F2
Depth (ft.)	8 - 10	12 - 14	8 - 10	12 - 14	6 - 9	12 - 15	6 - 8	12 - 14	8 - 10	14 - 16
Pyrene	5,030	5,260	6,470	2,210	1,040		31,400		7,440	2,310
Toluene		59	2.5	1,590		1.8	6.9	12.4	4.3	
1,2-Trans-dichloroethylene		18.6								
1,1,2-Trichloroethane			38.6			1.7	9.44	16.3	207	35.4
Trichloroethylene		21.1								
Trichlorofluoromethane		26	5.7		1.8	2.4	2.5			
Vinyl Chloride	430	516	8				15.2			
<b>Ionizable Organics</b>										
2-Chlorophenol	180	210								
2,4-Dichlorophenol		358	2,690	370						
Phenol		160	26,700							
<b>Inorganics</b>										
Antimony	6,000	7,300			5,700	11,000		9,300		
Arsenic	1,200	7,800	5,700	4,400	2,700	6,200	22,000	6,500	11,000	9,200
Beryllium	640	880	830	730	70	360	2,300	160	340	490
Cadmium	1,600	1,800			800		4,300			
Chromium	23,000	56,000	54,000	25,000	5,000	14,000	46,000	5,500	11,000	14,000
Copper	38,000	38,000	56,000	22,000	6,900	16,000	21,000	8,400	42,000	56,000
Lead	130,000	56,000	92,000	53,000	28,000	11,000	46,000	6,000	130,000	220,000
Mercury	140	120			70	73	130		83	98
Nickel	24,000	20,000	30,000	21,000	6,100	21,000	17,000	9,600	25,000	28,000
Selenium	230	240	580	640			6,900	210	270	200
Silver	1,800	1,500		340			320			350
Thallium	670	580	960	680			2,600		560	620
Zinc	110,000	120,000	160,000	270,000	34,000	47,000	260,000	40,000	120,000	230,000

All units reported in  $\mu\text{g}/\text{kg}$  unless otherwise noted.  
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Table 2-5A Phase II RFI Soil Sample Results - SWMU #1										
Constituent	FG-1S	FG-1D	FG-2S	FG-2D	FG-3S	FG-3D	FG-4S	FG-4D	FG-5S	FG-5D
Depth (ft.)	6 - 8	12 - 14	6 - 8	12 - 14	6 - 8	14 - 16	6 - 8	15 - 17	6 - 8	12 - 14
Acenaphthene	1,100	1,020	809	706	672	1,130	843		500	800
Anthracene	2,590	1,780	1,170	1,080	909	1,930	2,550		590	1,900
Benzene				65.9			6.48		847	589
Benzo(a)anthracene	4,200	2,690	1,270	1,680	1,910	3,330	3,660		1,500	8,200
Benzo(b)fluoranthene	3,010	2,150	1,200	1,490	1,860	3,210	2,800	150		6,940
Benzo(ghi)perylene		1,450	821	1,050	1,440	2,150	2,070		980	4,000
Benzo(a)pyrene	3,690	2,370	1,010	1,460	1,680	2,740	3,120		1,400	6,800
Bis(2-ethylhexyl)phthalate		610	380	510	810	690	430	490		
Chlorobenzene				23.9					462	280
Chrysene	4,510	2,970	1,640	1,850	2,120	3,820	3,980		1,800	9,460
Dibenzo(a,h)anthracene										1,100
Di-n-butyl phthalate	2,200	2,960	30,100	3,180	9,620	3,540	2,480	10,200	1,300	1,500
1,1-Dichloroethane	88.1				12.4					
1,1-Dichloroethylene	832	34.7	3.8	352			53.6	9.18	3,370	1,560
Ethylbenzene										
Fluoranthene	9,550	6,060	3,620	3,950	4,430	8,760	8,750	310	3,450	14,200
Fluorene	2,230	1,680	960	905	653	1,760	1,270		700	1,000
Indeno(1,2,3-c,d)pyrene		1,530	766	1,060	1,460	2,250	2,100		930	1,900
Methylene chloride	246	12.7	13.5	1,040					1,480	
Naphthalene	5,150	3,990	1,400	1,160	338	3,590	836	170	700	770
N-Nitrosodiphenylamine				284						
Phenanthrene	13,000	8,570	6,100	4,600	4,270	9,770	7,550	500	3,200	7,800
Pyrene	7,790	5,270	4,070	3,710	4,020	6,820	7,280	292	3,030	12,000
Tetrachloroethylene						2				
Toluene				34.9				3.6	1,440	1,330
1,1,2-Trichloroethane				32.5						
Trichloroethylene							3.2			

<b>Table 2-5A</b> <b>Phase II RFI Soil Sample Results - SWMU #1</b>										
<b>Constituent</b>	<b>FG-1S</b>	<b>FG-1D</b>	<b>FG-2S</b>	<b>FG-2D</b>	<b>FG-3S</b>	<b>FG-3D</b>	<b>FG-4S</b>	<b>FG-4D</b>	<b>FG-5S</b>	<b>FG-5D</b>
<i>Depth (ft.)</i>	<i>6 - 8</i>	<i>12 - 14</i>	<i>6 - 8</i>	<i>12 - 14</i>	<i>6 - 8</i>	<i>14 - 16</i>	<i>6 - 8</i>	<i>15 - 17</i>	<i>6 - 8</i>	<i>12 - 14</i>
Vinyl Chloride	1,400	26.9	62.9	693			138			
<b>Ionizable Organics</b>										
2,4-Dichlorophenol									1,900	2,500
2,4-Dimethylphenol			300							
Phenol		217		469					9,680	12,200
<b>Inorganics</b>										
Antimony				9,400	7,600					
Arsenic	7,600	7,900	76,000	46,000	48,000	24,000	9,600	5,600	30,000	23,000
Beryllium	700	1,100	760	690	640	1,000	760	870	3,100	2,000
Cadmium	1,800	2,900	2,800	2,800	3,100	3,100	2,500	2,300	7,700	5,700
Chromium	18,000	19,000	35,000	16,000	14,000	27,000	20,000	21,000	55,000	45,000
Copper	27,000	29,000	38,000	44,000	55,000	41,000	40,000	26,000	29,000	51,000
Lead	69,000	90,000	75,000	180,000	150,000	100,000	76,000	19,000	120,000	120,000
Mercury	110	190	3,100	1,100	3,800	560	110	71	94	140
Nickel	18,000	17,000	32,000	18,000	23,000	27,000	28,000	30,000	25,000	21,000
Selenium	400	310	520	300	320	300	380	300	2,900	3,100
Silver	420	480	380	690	480	450	500	280	420	400
Thallium	510	410	940	560	740	440	490	400	3,700	2,500
Zinc	98,000	266,000	120,000	190,000	98,000	130,000	120,000	65,000	308,000	262,000

All units reported in µg/kg unless otherwise noted.

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**Table 2-5B**  
**Phase II RFI Soil Sample Results - SWMU #1**

Constituent	FG-6S	FG-6D	FG-7S	FG-7D	FG-8S	FG-8D	FG-9S	FG-9D	FG-10S	FG-10D
<i>Depth (ft)</i>	<i>6 - 8</i>	<i>13 - 15</i>	<i>6 - 8</i>	<i>12 - 14</i>	<i>6 - 8</i>	<i>12 - 16</i>	<i>6 - 8</i>	<i>10 - 14</i>	<i>6 - 8</i>	<i>12 - 14</i>
Acenaphthene	100	283	2,850	510	1,180		299	980		754
Acenaphthylene			3,680							
Anthracene	250	899	4,000	1,130	3,360	318	1,520	1,150		1,200
Benzene	10.6	8.36	670	48.8	1,980	116	9,570	2,920		3.6
Benzo(a)anthracene	570	1,610	1,710	1,780	1,540	380	2,770	1,900		1,820
Benzo(b)fluoranthene	852	1,270	1,070	1,630	1,250	260	2,290	1,500		1,550
Benzo(k)fluoranthene		959								
Benzo(ghi)perylene	320	943	1,080	1,110	683		1,900			990
Benzo(a)pyrene	485	1,340	1,350	1,730	977	290	2,670	1,610		1,560
Bis(2-ethylexyl)phthalate	280	220	2,560	440		340	690		280	400
Chlorobenzene						14.4	1,600	670		2.4
Chrysene	708	1,740	2,010	2,050	2,700	473	2,940	1,950		1,940
Di-n-butyl phthalate	2,740	3,650	1,430	1,830	3,210	2,280	9,900	1,800	1,200	16,100
1,2-Dichlorobenzene(o)			160				349			
1,1-Dichloroethane					180					
1,1-Dichloroethylene			580	153	400	68.2	200,000	44,400	4.16	4.2
Ethylbenzene			64				4,100	2,070		
Fluoranthene	1,300	8,310	4,720	3,890	4,540	954	5,590	4,500		4,680
Fluorene	130	445	6,800	813	1,290	210	394	1,390	30	1,200
Indeno(1,2,3-c,d)pyrene		903	1,080	1,060	651		1,760			1,060
Methylene chloride	14.9	13.7	134	1,010	1,360	8.23	69,300	39,900		
Naphthalene	130	352	12,600	2,090	2,360	214	3,610	2,320	100	1,980
Nitrobenzene							865			
Phenanthrene	1,210	3,650	14,900	4,300	8,600	1,100	7,280	6,160	260	5,650
Pyrene	1,040	3,140	6,230	3,180	6,670	932	5,350	3,860	100	4,190
Tetrachloroethylene					86	59.5	6390	2,120		
Toluene			544	39.2	1,220	73	11,900	4,620		6.5

Table 2-5B										
Phase II RFI Soil Sample Results - SWMU #1										
Constituent	FG-6S	FG-6D	FG-7S	FG-7D	FG-8S	FG-8D	FG-9S	FG-9D	FG-10S	FG-10D
Depth (ft)	6 - 8	13 - 15	6 - 8	12 - 14	6 - 8	12 - 16	6 - 8	10 - 14	6 - 8	12 - 14
1,1,1-Trichloroethane								220		
1,1,2-Trichloroethane			344				225,000	47,600		
Trichloroethylene					266	16.8	10,300	3,340		
Vinyl Chloride			2,670	1,240		55.6				
<b>Ionizable Organics</b>										
2,4-Dichlorophenol	71	68	524		449		62,700			
2,4-Dimethylphenol					270					
Pentachlorophenol					887		774			
Phenol	900	504	11,000	1,750	343		7,290			
2,4,6-Trichlorophenol							668			
<b>Inorganics</b>										
Antimony	3,000									
Arsenic	13,000	17,000	29,000	16,000	193,000	33,000	4,800	6,500	3,200	11,000
Beryllium	3,000	2,600	2,500	620	990	560	2,000	630	1,000	680
Cadmium	4,900	7,100	5,000	2,400	2,600	2,000	2,400	1,600	2,500	1,800
Chromium	29,000	43,000	453,000	13,000	45,000	14,000	41,000	14,000	31,000	15,000
Copper	23,000	34,000	110,000	71,000	90,000	43,000	53,000	20,000	32,000	34,000
Lead	41,000	88,000	390,000	110,000	110,000	190,000	48,000	91,000	38,000	310,000
Mercury	84	180	590	190	190	240	220	220	48	350
Nickel	20,000	23,000	47,000	20,000	34,000	15,000	32,000	11,000	31,000	14,000
Selenium	2,400	2,200	8,200	830	1,200	480	1,300	280		290
Silver	460	680	1,300	600	470		460	460	540	490
Thallium	500	2,400		510	3,200		330	480	750	
Zinc	190,000	240,000	1,410,000	160,000	160,000	210,000	74,000	87,000	79,000	160,000

All results reported in  $\mu\text{g}/\text{kg}$  unless otherwise noted.

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Table 2-7 Phase I RFI Soil Sample Results - SWMU #3				
Constituent	B321F1	B321F2	B328F1	B328F2
Depth (ft.)	10 - 15	15 - 17	10 - 12	14 - 16
Acenaphthene	1,150	150	500	260
Alpha-BHC				205
Anthracene	3,310	308	722	320
Benzene	10		2.6	5.04
Benzo(a)anthracene	5,020		1,200	830
Benzo(b)fluoranthene	3,270		1,630	650
Benzo(ghi)perylene	2,200		590	
Benzo(k)fluoranthene	2,830		220	
Benzo(a)pyrene	3,890		1,030	925
Bis(2-ethylhexyl)phthalate	3,340		380	870
Chlorobenzene	9.6			
Chloroform				0.93
Chrysene	4,440		1,100	806
Dibenzo(a,h)anthracene	640			
Di-n-butyl phthalate			580	1,400
1,1-Dichloroethylene			1.4	9.12
Ethylbenzene			1.4	2.1
Fluoranthene	9,940	1,450	2,960	1,430
Fluorene	1,860	180	791	230
Indeno(1,2,3-c,d)pyrene	983		240	230
Methylene chloride	42.5	30.9	49.3	275
Naphthalene	889	180	1,040	
Phenanthrene	10,200	1,280	4,020	1,510
Pyrene	7,630	1,060	2,640	1,460
Toluene	8.6	3.4	3	4.1
1,2-Trans-dichloroethylene				3.02
1,1,1-Trichloroethane			1.2	

<b>Table 2-7</b> <b>Phase I RFI Soil Sample Results - SWMU #3</b>				
<b>Constituent</b>	<b>B321F1</b>	<b>B321F2</b>	<b>B328F1</b>	<b>B328F2</b>
<i>Depth (ft.)</i>	<i>10 - 15</i>	<i>15 - 17</i>	<i>10 - 12</i>	<i>14 - 16</i>
1,1,2-Trichloroethane	34.1		4.7	41.9
Trichloroethylene			3.59	3.97
Trichlorofluoromethane				2.2
Vinyl Chloride				13.9
<b>Ionizable Organics</b>				
2,4-Dichlorophenol	816			
Phenol	3,830			
<b>Inorganics</b>				
Antimony	9,300	9,300		
Arsenic	18,000	9,000	3,700	5,900
Beryllium	430	340	330	350
Chromium	15,000	14,000	14,000	13,000
Copper	27,000	21,000	31,000	30,000
Lead	25,000	14,000	32,000	32,000
Mercury	150	63	78	73
Nickel	25,000	24,000	34,000	31,000
Selenium		240		
Silver			460	280
Thallium	500	580	320	460
Zinc	73,000	53,000	71,000	48,000

All units reported in  $\mu\text{g}/\text{kg}$  unless otherwise noted.



**Table 2-9A**  
**Phase I and II RFI Soil Sample Results - SWMU #4**

Constituent	B310F1	B310F2	B311F1	B311F2	B320F1	B320F2	B326F1	B326F2	B327F1	B327F2
Depth (ft.)	8 - 11	14 - 16	8 - 10	16 - 18	10 - 12	14 - 16	8 - 10	16 - 19	10 - 12	14 - 16
Acenaphthene	7,780	140	804		522	810	3,270	110	670	261
Anthracene	19,200	288	1,720	170	1,090	1,870	6,150	246	636	543
Benzene	1.9		13,100	6.28	1.7		6.16		6.37	
Benzo(a)anthracene	28,000	740	3,600		2,030	4,100	11,700		1,170	870
Benzo(b)fluoranthene	22,400	643	2,920		1,770	4,280	8,590			928
Benzo(ghi)perylene	14,700	783	1,870			2,340				
Benzo(k)fluoranthene	17,700	455	1,520		1,930	2,260	5,140			507
Benzo(a)pyrene	25,800	691	2,830		2,270	4,040	8,220			733
Bis(2-ethylexyl)phthalate			1,920					2,690		
Chlorobenzene			76,700	8.98			5.1			
Chrysene	27,700	719	3,780		2,180	4,050	10,800		1,310	846
DDD										
DDE										
DDT						1,530				
Dibenzo(a,h)anthracene			690							
1,1-Dichloroethylene							1.6			
Di-n-butyl phthalate										
Ethylbenzene			9,490	1.2						
Fluoranthene	42,400	1,250	4,930	478	4,130	7,280	17,900	598	1,110	1,620
Fluorene	11,200	180	1,190		651	968	4,340	170	961	322
Indeno(1,2,3-c,d)pyrene	5,500	470	800			962				
Methylene chloride	55.4	41.6	5090	23.4	30.5	17.6	46	54.8	62.8	32.8
Naphthalene	10,300	706	1,600	160	864	625	5,540	256	1,670	469
Phenanthrene	82,100	1,290	8,350	761	4,670	7,980	21,100	973	3,770	2,270
Pyrene	30,700	1,040	4,080	363	2,810	5,060	13,200	412	752	1,130
Toluene			12,600	4.6			5			3.4
1,2-Trans-dichloroethylene	27.9									

<b>Table 2-9A</b> <b>Phase I and II RFI Soil Sample Results - SWMU #4</b>										
<b>Constituent</b>	<b>B310F1</b>	<b>B310F2</b>	<b>B311F1</b>	<b>B311F2</b>	<b>B320F1</b>	<b>B320F2</b>	<b>B326F1</b>	<b>B326F2</b>	<b>B327F1</b>	<b>B327F2</b>
<i>Depth (ft.)</i>	<i>8 - 11</i>	<i>14 - 16</i>	<i>8 - 10</i>	<i>16 - 18</i>	<i>10 - 12</i>	<i>14 - 16</i>	<i>8 - 10</i>	<i>16 - 19</i>	<i>10 - 12</i>	<i>14 - 16</i>
1,1,1-Trichloroethane										
1,1,2-Trichloroethane	13.8	16.4		6.92			18.4		10.4	2.6
Trichloroethylene	28.9									
Trichlorofluoromethane	8.7	6.2					2.1			2.2
Vinyl Chloride										
<b>Ionizable Organics</b>										
2,4-Dichlorophenol										
2,4-Dimethylphenol										
Phenol					727	561		1,020	767	503
<b>Inorganics</b>										
Antimony	8,100	11,000	9,600	10,000	5,600	12,000	6,500	5,700	13,000	9,900
Arsenic	8,500	6,800	37,000	27,000	12,000	10,000	7,000	5,400	5,700	6,500
Beryllium	390	500	360	380	570	590	330	270	430	450
Cadmium	660		180		2,100					
Chromium	14,000	18,000	11,000	12,000	18,000	19,000	49,000	11,000	16,000	16,000
Copper	58,000	30,000	129,000	35,000	34,000	37,000	20,000	21,000	30,000	34,000
Lead	190,000	36,000	140,000	75,000	33,000	36,000	90,000	25,000	33,000	100,000
Mercury	440	58	1,100	870	400	130	140	58	120	160
Nickel	24,000	31,000	17,000	22,000	30,000	36,000	10,000	20,000	30,000	24,000
Selenium	160	290	370	450		320	130		140	270
Silver					2,700					
Thallium	270	350		1,200	450	680				510
Zinc	160,000	66,000	110,000	83,000	100,000	120,000	110,000	40,000	60,000	98,000

All units reported in µg/kg unless otherwise noted.

Table 2-9B								
Phase I and II RFI Soil Sample Results - SWMU #4								
Constituent	G303F1	G303F2	G337F1	G337F2	P319F1	P319F2	FG-17S	FG-17D
Depth (ft.)	8 - 10	16 - 18	8 - 12	14 - 16	8 - 10	14 - 16	6 - 8	15 - 17
Acenaphthene	1,800		1,600				1,570	331
Anthracene	7,100					2,300	3,210	525
Benzene		2.5	2.6		1,360	146	877	58.2
Benzo(a)anthracene	18,300	270			240	4,800	6,720	890
Benzo(b)fluoranthene	18,600	180			180	3,500	5,590	878
Benzo(ghi)perylene	9,640				160	2,600	4,660	563
Benzo(k)fluoranthene	8,840	190			230	4,330		
Benzo(a)pyrene	14,400	230			200	4,930	5,600	745
Bis(2-ethylexyl)phthalate							380	240
Chlorobenzene					410	268	140	12
Chrysene	16,800	240	3280		230	5,280	7,570	981
DDD	98	12.5			48.5	36.8		
DDE	62.5							
DDT								
Dibenzo(a,h)anthracene	2,500							
1,1-Dichloroethylene					33.8		4,860	450
Di-n-butyl phthalate							3,690	8,700
Ethylbenzene	1.7				25	37.5		
Fluoranthene	32,900	442	5,120		385	9,480	14,200	2,370
Fluorene			1,200				2,450	463
Indeno(1,2,3-c,d)pyrene	4,000						4,810	548
Methylene chloride	37.0	45.5	29.1	1,060	1,160	136	369	298
Naphthalene			1500		140	1,700	2,300	496
Phenanthrene	21,600	430	6200	180	460	6,100	12,300	2,640
Pyrene	24,500	362	4810		385	7,760	12,600	2,100
Toluene	2	1.2	1.4		421	155	2,360	79.1
1,2-Trans-dichloroethylene								

<b>Table 2-9B</b> <b>Phase I and II RFI Soil Sample Results - SWMU #4</b>								
<b>Constituent</b>	<b>G303F1</b>	<b>G303F2</b>	<b>G337F1</b>	<b>G337F2</b>	<b>P319F1</b>	<b>P319F2</b>	<b>FG-17S</b>	<b>FG-17D</b>
<i>Depth (ft.)</i>	<i>8 - 10</i>	<i>16 - 18</i>	<i>8 - 12</i>	<i>14 - 16</i>	<i>8 - 10</i>	<i>14 - 16</i>	<i>6 - 8</i>	<i>15 - 17</i>
1,1,1-Trichloroethane	1.3							
1,1,2-Trichloroethane								
Trichloroethylene								
Trichlorofluoromethane	1.5		1.5	31	21			
Vinyl Chloride					218			1,440
<b>Ionizable Organics</b>								
2,4-Dichlorophenol							3,560	
2,4-Dimethylphenol							290	
Phenol							9,110	
<b>Inorganics</b>								
Antimony	3,200	6,000	7,400	8,200	7,100	9,000		
Arsenic	4,200	9,600	6,000	7,100	5,600	11,000	4,800	8,500
Beryllium	450	500	640	560	680	570	620	700
Cadmium	1,300	1,600	2,200	1,800	2,000	1,700	1,900	1,800
Chromium	8,100	17,000	16,000	15,000	20,000	22,000	18,000	18,000
Copper	18,000	32,000	36,000	34,000	35,000	40,000	136,000	31,000
Lead	95,000	30,000	120,000	18,000	20,000	470,000	530,000	39,000
Mercury	120	55	190	62	63	160	48	70
Nickel	6,800	27,000	25,000	31,000	32,000	15,000	15,000	31,000
Selenium				150			200	280
Silver	1,700	1,700	2,800	1,900	2,300	1,900	500	610
Thallium		740	450	770	510		450	400
Zinc	69,000	89,000	150,000	52,000	65,000	250,000	277,000	59,000

All units reported in  $\mu\text{g}/\text{kg}$  unless otherwise noted.

<b>Table 2-12</b> <b>Phase I RFI Soil Sample Results - SWMU #5</b>				
<b>Constituent</b>	<b>G318F1</b>	<b>G318F2</b>	<b>G336F1</b>	<b>G336F2</b>
<i>Depth (ft.)</i>	<i>8 - 11</i>	<i>14 - 16</i>	<i>9.5 - 12.5</i>	<i>14 - 16</i>
Acenaphthene		482		
Anthracene		604		
Benzene	4.54	1.3	44.1	8.31
Benzo(a)anthracene		1,120		
Benzo(b)fluoranthene		962		
Benzo(ghi)perylene		826		
Benzo(k)fluoranthene		904		
Benzo(a)pyrene		1,200		
Bis(2-Ethylhexyl)phthalate	2,860			
Chlorobenzene	1.9		20.6	
Chrysene		1,060		
1,2-Dichloroethane	5.35			
1,1-Dichloroethylene	11.4			
Ethylbenzene	1.7			
Fluoranthene		2,020	2,600	
Fluorene		686		
Indeno(1,2,3-c,d)pyrene		330		
Methylene chloride	52.6	28.6	29.3	12.3
Naphthalene		1,190		
Phenanthrene		2,930	2,800	
Pyrene		1,560	2,200	
Toluene	10.3	3.3	7.6	
1,1,2-Trichloroethane	12.4			
Trichloroethylene	1.9	3.84		
Trichlorofluoromethane	5			
<b>Inorganics</b>				
Antimony	7,300	7,300	5,300	7,400

<b>Table 2-12</b> <b>Phase I RFI Soil Sample Results - SWMU #5</b>				
<b>Constituent</b>	<b>G318F1</b>	<b>G318F2</b>	<b>G336F1</b>	<b>G336F2</b>
<i>Depth (ft.)</i>	<i>8 - 11</i>	<i>14 - 16</i>	<i>9.5 - 12.5</i>	<i>14 - 16</i>
Arsenic	5,200	11,000	10,000	4,200
Beryllium	510	640	390	430
Cadmium	1,500	2,000	3,000	2,800
Copper	21,000	29,000	36,000	34,000
Chromium	41,000	23,000	8,400	10,000
Lead	11,000	95,000	310,000	38,000
Mercury	51	140	140	53
Nickel	23,000	27,000	6,900	13,000
Selenium			260	
Silver	2,000	2,700	3,700	3,500
Thallium		450		
Zinc	50,000	74,000	85,000	60,000

All units reported in  $\mu\text{g}/\text{kg}$  unless otherwise noted

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<b>Table 2-16A</b> <b>Phase I and II RFI Soil Sample Results - SWMU #6</b>								
<b>Constituent</b>	<b>B301F1</b>	<b>B301F2</b>	<b>B309F1</b>	<b>B309F2</b>	<b>B325F1</b>	<b>B325F2</b>	<b>B335F1</b>	<b>B335F2</b>
<i>Depth (ft.)</i>	<i>8 - 11</i>	<i>14 - 17</i>	<i>8 - 10</i>	<i>16 - 18</i>	<i>8 - 10</i>	<i>16 - 18</i>	<i>8 - 10</i>	<i>12 - 14</i>
Acenaphthene			473		1,400	327	10,000	
Anthracene		140	678		3,670	771	31,600	
Benzene	27	7.19	7,240	14.1	5.63	5.33	4.54	4.7
Benzo(a)anthracene	1,800	310	1,790			1,500	12,400	5,474
Benzo(b)fluoranthene	2,100	220	2,440			1,110		
Benzo(ghi)perylene			1,270			849	19,200	
Benzo(k)fluoranthene		210	1,060			887	61,000	
Benzo(a)pyrene	1,800	220	1,510			1,280	35,000	
bis(2-Ethylhexyl)phthalate		11,100						
Chlorobenzene	61.5		543					
Chloroform			801					
Chrysene	1,700	318	1,990			1,440	49,000	
DDD	55.9							
DDE	60.9							
Di-n-butyl phthalate		980						
1,2-Dichlorobenzene(o)			794					
1,4-Dichlorobenzene(p)			150					
1,1-Dichloroethane			170					
1,2-Dichloroethane			1,140		4.59			
1,1-Dichloroethylene			36,900	14.1	3.27	3.6		
Ethylbenzene			329					
Fluoranthene	4,150	577	2,160		12,500	2,470	117,000	9,950
Fluorene		130	692		1,400	551	19,000	
Hexachlorobenzene			11,200					
Indeno(1,2,3-c,d)pyrene			440			340	7,510	
Isophorone			130					
Methylene chloride	734	948	31,600	154	63.9	70.8	54.0	149

<b>Table 2-16A</b> <b>Phase I and II RFI Soil Sample Results - SWMU #6</b>								
<b>Constituent</b>	<b>B301F1</b>	<b>B301F2</b>	<b>B309F1</b>	<b>B309F2</b>	<b>B325F1</b>	<b>B325F2</b>	<b>B335F1</b>	<b>B335F2</b>
<i>Depth (ft.)</i>	<i>8 - 11</i>	<i>14 - 17</i>	<i>8 - 10</i>	<i>16 - 18</i>	<i>8 - 10</i>	<i>16 - 18</i>	<i>8 - 10</i>	<i>12 - 14</i>
Naphthalene		160	2,320		1,100	535	16,000	
Phenanthrene	4,100	610	4,040	120	14,500	3,730	155,000	6,315
Pyrene	3,280	416	1,990		9,210	1,900	88,600	7,240
Tetrachloroethylene			103					
Toluene	53	3.7	77,800	2.4	6.63		2.6	
1,2-Trans-dichloroethylene			167					
1,1,1-Trichloroethane			192					
1,1,2-Trichloroethane			109,000		44.3	15.2	4.2	12.0
Trichloroethylene			195					
Trichlorofluoromethane					7.3			
Vinyl Chloride			939					
<b>Ionizable Organics</b>								
2,4-Dichlorophenol			25,000					
Phenol			8,630			669		
2,4,6-Trichlorophenol			1,300					
<b>Inorganics</b>								
Antimony	4,400	17,000	15,000	13,000	11,000	7,800		
Arsenic	3,600	10,000	1,200	7,100	5,500	5,800	24,000	20,000
Beryllium	700	590	400	480	690	510	810	600
Cadmium	2,900				260		2,100	960
Chromium	14,000	17,000	180,000	18,000	50,000	32,000	17,000	18,000
Copper	24,000	32,000	28,000	28,000	42,000	82,000	74,000	53,000
Lead	220,000	48,000	86,000	13,000	280,000	76,000	500,000	180,000
Mercury	120	110	100	58	230	60	370	240
Nickel	12,000	25,000	23,000	29,000	21,000	28,000	21,000	16,000
Selenium			400	190	210			
Silver	3,500	280	1,100	260			2,400	1,600



<b>Table 2-16A</b> <b>Phase I and II RFI Soil Sample Results - SWMU #6</b>								
<b>Constituent</b>	<b>B301F1</b>	<b>B301F2</b>	<b>B309F1</b>	<b>B309F2</b>	<b>B325F1</b>	<b>B325F2</b>	<b>B335F1</b>	<b>B335F2</b>
<i>Depth (ft.)</i>	<i>8 - 11</i>	<i>14 - 17</i>	<i>8 - 10</i>	<i>16 - 18</i>	<i>8 - 10</i>	<i>16 - 18</i>	<i>8 - 10</i>	<i>12 - 14</i>
Thallium				620			2,100	1,500
Zinc	352,000	85,000	160,000	53,000	268,000	230,000	371,000	150,000

All units reported in  $\mu\text{g/kg}$  unless otherwise noted.

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Table 2-16B

## Phase I and II RFI Soil Sample Results - SWMU #6

Constituent	G308F1	G308F2	G317F1	G317F2	G324F1	G324F2	G324AF1	G324AF2	G316F1	P316F2
Depth (ft.)	8 - 10	12 - 14	10 - 12	14 - 16	8 - 10	12 - 14	8 - 10	12 - 14	8 - 10	15 - 17
Acenaphthene	4,820	3,030					18,900	835		
Alpha-BHC										301
Anthracene	10,200	5,880				2,830	26,400	1,410		
Benzene	1.5	2.2		7.48	5.19		1.9	1.8	13.1	15.5
Benzo(a)anthracene	27,600	7,000					42,000	3,190		
Benzo(b)fluoranthene		4,300					28,400	2,950		
Benzo(ghi)perylene	14,100	3,500					17,300	1,260		
Benzo(k)fluoranthene	42,900						3,255	258		
Benzo(a)pyrene	22,700	5,200					27,600	2,040		
Chlorobenzene					6.21					22.6
Chrysene	28,700	7,470				4,690	38,500	3,280		
Dibenz(a,h)anthracene					4,680					
DDD										
DDE										
Di-n-butyl phthalate										
1,2-Dichlorobenzene(o)										
1,4-Dichlorobenzene(p)										
1,1-Dichloroethane										3.1
1,2-Dichloroethane										1.7
1,1-Dichloroethylene				6.2						
Ethylbenzene				3.5					47.2	9.7
Fluoranthene	72,100	30,200			9,940	10,200	103,000	10,900		
Fluorene	5,230	3,620					16,400	967		
Indeno(1,2,3-c,d)pyrene	5,100						6,740	500		
Isophorone										

**Table 2-16B**  
**Phase I and II RFI Soil Sample Results - SWMU #6**

<b>Constituent</b>	<b>G308F1</b>	<b>G308F2</b>	<b>G317F1</b>	<b>G317F2</b>	<b>G324F1</b>	<b>G324F2</b>	<b>G324AF1</b>	<b>G324AF2</b>	<b>G316F1</b>	<b>P316F2</b>
<i>Depth (ft.)</i>	<i>8 - 10</i>	<i>12 - 14</i>	<i>10 - 12</i>	<i>14 - 16</i>	<i>8 - 10</i>	<i>12 - 14</i>	<i>8 - 10</i>	<i>12 - 14</i>	<i>8 - 10</i>	<i>15 - 17</i>
Methylene chloride	19.4	21.7	9.49	16.5		17.3	22.7	36.9	40.2	23.3
Naphthalene	2,650	4,420					8,500	2,500		
Phenanthrene	51,200	26,700		198	7,320	10,900	103,000	5,560		
Pyrene	54,700	23,600			7,710	8,610	83,000	8,830		
Tetrachloroethylene									26.7	
Toluene			3.1	13.6					116	15.5
1,2-Trans-dichloroethylene							1.6	2.75		
1,1,1-Trichloroethane										
1,1,2-Trichloroethane										
Trichloroethylene										
Trichlorofluoromethane										
Vinyl Chloride										
<b>Ionizable Organics</b>										
2,4-Dichlorophenol										
Phenol										
<b>Inorganics</b>										
Antimony				45,000	11,000	8,700			10,000	
Arsenic	9,100	9,700	1,000	2,400	4,100	19,000	12,000	14,000	1,500	4,400
Beryllium	650	850		220	560	470	750	840	490	810
Cadmium	3,000	4,600	34,500	7,700	2,500	3,900	4,300	5,000	1,300	1,700
Chromium	14,000	20,000	140,000	1,110,000	18,000	179,000	72,000	19,000	552,000	31,000
Copper	63,000	49,000	46,000	47,000	58,000	25,000	48,000	45,000	25,000	42,000
Lead	130,000	100,000	35,000	72,000	180,000	290,000	190,000	39,000	12,000	160,000
Mercury	250	140		150	300	180	240	130		290
Nickel	34,000	29,000	7,200	14,000	2,100	8,400	27,000	36,000	9,000	16,000

**Table 2-16B**  
**Phase I and II RFI Soil Sample Results - SWMU #6**

<b>Constituent</b>	<b>G308F1</b>	<b>G308F2</b>	<b>G317F1</b>	<b>G317F2</b>	<b>G324F1</b>	<b>G324F2</b>	<b>G324AF1</b>	<b>G324AF2</b>	<b>G316F1</b>	<b>P316F2</b>
<i>Depth (ft.)</i>	<i>8 - 10</i>	<i>12 - 14</i>	<i>10 - 12</i>	<i>14 - 16</i>	<i>8 - 10</i>	<i>12 - 14</i>	<i>8 - 10</i>	<i>12 - 14</i>	<i>8 - 10</i>	<i>15 - 17</i>
Selenium		390								
Silver	2,000	1,700	10,000	9,500	2,000	4,800	1,400	1,800	4,700	2,400
Thallium		590						1,300		
Zinc	130,000	110,000	41,000	99,000	180,000	120,000	160,000	76,000	15,000	220,000

All units reported in  $\mu\text{g}/\text{kg}$  unless otherwise noted.

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Table 2-20 Phase I RFI Soil Sample Results - SWMU #10												
Chemical	B345F1	B345F2	B346F1	B346F2	G344F1	G344F2	G347F1	G347F2	G348F1	G348F2	G349F1	G349F2
Depth (ft.)	4 - 6	10 - 12	2 - 4	6 - 8	4 - 6	10 - 12	4 - 6	10 - 12	4 - 6	10 - 12	4 - 6	8 - 10
Acenaphthene												
Anthracene												
Benzene	31.4	1.5			3	51.4				6.1		154
Benzo(a)anthracene												
Benzo(b)fluoranthene												
Benzo(ghi)perylene												
Benzo(k)fluoranthene												
Benzo(a)pyrene												
Bis(2-ethylhexyl)phthalate	9,370	210				1,400			990			
Chlorobenzene	63		322		1.9	13.4				15.8		68
Chloroform									1.79			
Chrysene								379				
DDT					241							
Di-n-butyl phthalate				310					950			
1,1-Dichloroethane										1.8		
1,2-Dichloroethane	12.7				1.7	12.2			5.45	2.1		
1,1-Dichloroethylene									10.8	2		
Dieldrin					304							
Endosulfan sulfate					4,040							
Endrin			128		1,160							
Endrin aldehyde												
Ethylbenzene	13	1.4	863		6.2	88.5				11.9	20	1,790
Fluoranthene			2,000	477	2,200			903	210	594	576	
Fluorene			1,400									
Heptachlor												
Hexachlorobenzene									7,460		2,020	
Hexachlorobutodiene									437			

Table 2-20 Phase I RFI Soil Sample Results - SWMU #10												
Chemical	B345F1	B345F2	B346F1	B346F2	G344F1	G344F2	G347F1	G347F2	G348F1	G348F2	G349F1	G349F2
Depth (ft.)	4 - 6	10 - 12	2 - 4	6 - 8	4 - 6	10 - 12	4 - 6	10 - 12	4 - 6	10 - 12	4 - 6	8 - 10
Alpha-BHC					624							
Indeno(1,2,3-c,d)pyrene												
Isophorone										758		
Methylene chloride	59.7	18.6	98.8	8.99	21.9	42.2	25	16	15.7	11.8	173	405
Naphthalene						4840				649	534	3140
Nitrobenzene	777											
Phenanthrene			6,500	440				590	430	490	290	
Pyrene			1,900	410	1,900			1,030	230			
Tetrachloroethylene											976	424
Toluene	191	13.2	622	1.4		217			1.5	256	35	2,720
1,2,4-Trichlorobenzene									1,270			
1,2-Trans-dichloroethylene					1.3							
1,1,1-Trichloroethane									5.13			
1,1,2-Trichloroethane									3.6			
Trichloroethylene					2.65	3.4			2.08	19	353.8	45
Trichlorofluoromethane		1.8			2.1		2.9				14	
Vinyl Chloride												
<b>Ionizable Organics</b>												
2-Chlorophenol	21,500	6,170										
2,4-Dichlorophenol	2,660	1,130	6,740						1,930			
Phenol	4,390		2,050	1,680		3,620					1,450	
<b>Inorganics</b>												
Antimony	11,000	30,000	29,000	20,000			9,200	7,100	1,800	20,000	5,500	14,000
Arsenic	19,000	31,000	27,000	15,000	15,000	21,000	7,500	3,700	1,900	31,000	13,000	30,000
Beryllium	3,000	26,000	2,600	1,600	2,200	2,200	260	50	50	3,000	1,600	2,000
Cadmium	6,600	3,600	1,600	2,500	6,100	5,800			94	6,300	870	2,200
Chromium (6+)	76,000	79,000	68,000	43,000	38,000	39,000	10,000	3,400	4,200	52,000	60,000	47,000

<b>Table 2-20</b> <b>Phase I RFI Soil Sample Results - SWMU #10</b>												
<b>Chemical</b>	<b>B345F1</b>	<b>B345F2</b>	<b>B346F1</b>	<b>B346F2</b>	<b>G344F1</b>	<b>G344F2</b>	<b>G347F1</b>	<b>G347F2</b>	<b>G348F1</b>	<b>G348F2</b>	<b>G349F1</b>	<b>G349F2</b>
<i>Depth (ft.)</i>	<i>4 - 6</i>	<i>10 - 12</i>	<i>2 - 4</i>	<i>6 - 8</i>	<i>4 - 6</i>	<i>10 - 12</i>	<i>4 - 6</i>	<i>10 - 12</i>	<i>4 - 6</i>	<i>10 - 12</i>	<i>4 - 6</i>	<i>8 - 10</i>
Copper	47,000	31,000	33,000	20,000	50,000	31,000	25,000	4,800	5,100	21,000	22,000	22,000
Lead	57,000	46,000	51,000	37,000	130,000	68,000	24,000	55,000	9,500	89,000	75,000	32,000
Mercury	82		120	180	160	73	70	96		82	160	72
Nickel	40,000	44,000	38,000	24,000	19,000	20,000	23,000	4,000	5,300	22,000	28,000	27,000
Selenium	1,700	4,200	2,700	2,200	2,500	3,300	130			3,800	4,200	2,700
Silver	3,700	470			2,700	1,600					590	270
Thallium	1,700	3,800	2,300	1,500	1,700	1,800	380			3,400	880	3,100
Zinc	425,000	476,000	308,000	252,000	239,000	190,000	52,000	38,000	29,000	428,000	210,000	250,000

All units reported in  $\mu\text{g}/\text{kg}$  unless otherwise noted.

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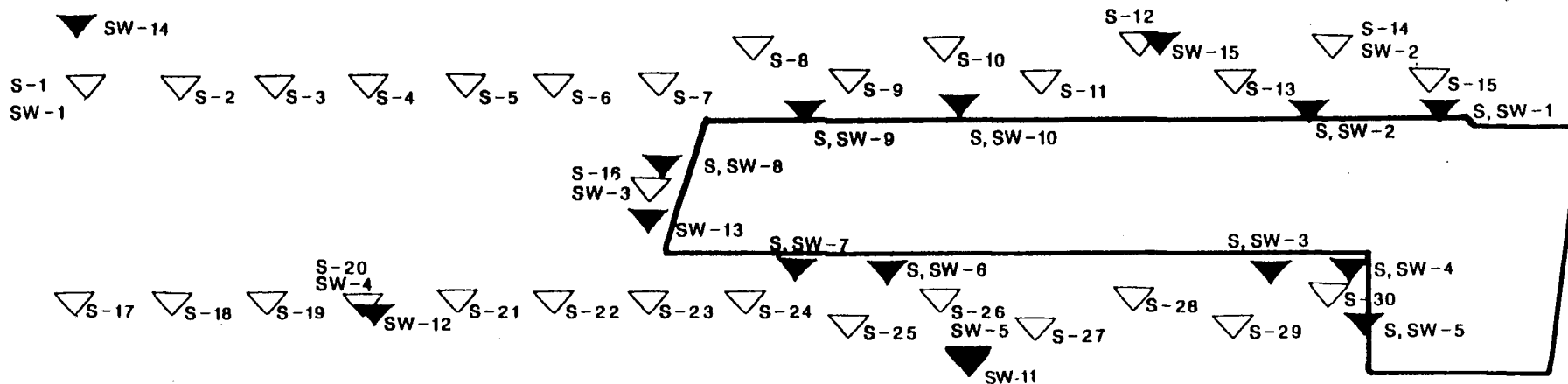
<p align="center"><b>Table 2-21</b> <b>Phase II RFI Soil Sample Results - SWMU #10</b></p>								
<b>Constituent</b>	<b>FG-11S</b>	<b>FG-11D</b>	<b>FG-12S</b>	<b>FG-12D</b>	<b>FG-13S</b>	<b>FG-13D</b>	<b>FG-14S</b>	<b>FG-14D</b>
<i>Depth (ft.)</i>	<i>2 - 6</i>	<i>14 - 16</i>	<i>2 - 4</i>	<i>12 - 14</i>	<i>2 - 4</i>	<i>13 - 15</i>	<i>2 - 4</i>	<i>14 - 16</i>
Acenaphthene				1,400			843	
Anthracene				4,320			2,550	1,500
Benzene		2,280		67.1	180	160		828
Benzo(a)anthracene				5,800			3,660	3,800
Benzo(b)fluoranthene				4,000			2,800	2,700
Benzo(ghi)perylene							2,070	
Benzo(a)pyrene				4,680			3,120	3,300
Bis(2-ethylhexyl)phthalate		1,100					430	
Chlorobenzene					580	180		71
Chrysene				6,400			3,980	4,480
Di-n-butyl phthalate	1,600	2,510	8,640				2,480	
Di-n-octyl-phthalate		280						
1,1-Dichloroethane						460		
1,2-Dichloroethane		235						
1,1-Dichloroethylene							53.6	
Ethylbenzene				216	4,070	946	42	623
Fluoranthene		180	150	13,700			8,750	7,120
Fluorene		35		3,000			1,270	
Hexachlorobenzene					8,930			
Indeno(1,2,3-c,d)pyrene			766	1,060			2,100	
Methylene chloride				45		542		476
Naphthalene		55		2,740	1,400		3,830	2,910
Nitrobenzene					2,480			
Phenanthrene		150		18,800				7,550
Pyrene		442	110	11,200				6,710
Tetrachloroethylene					410	140		
Toluene				349	7,110	4,830	272	4,200



<p align="center"><b>Table 2-21</b> <b>Phase II RFI Soil Sample Results - SWMU #10</b></p>								
<b>Constituent</b>	<b>FG-11S</b>	<b>FG-11D</b>	<b>FG-12S</b>	<b>FG-12D</b>	<b>FG-13S</b>	<b>FG-13D</b>	<b>FG-14S</b>	<b>FG-14D</b>
<i>Depth (ft.)</i>	<i>2 - 6</i>	<i>14 - 16</i>	<i>2 - 4</i>	<i>12 - 14</i>	<i>2 - 4</i>	<i>13 - 15</i>	<i>2 - 4</i>	<i>14 - 16</i>
1,1,2-Trichloroethane				32.5				
Trichloroethylene					190		3.2	
Trichlorofluoromethane	22.4							
2,4,6-Trichlorophenol		280			4,650	2,400		
Vinyl Chloride			62.9	693			138	
<b>Ionizable Organics</b>								
2-Chlorophenol		1,060			4,610	3,700		
2,4-Dichlorophenol		1,930	300		65,000	44,400	3,000	2,100
Phenol		963	435	3,180	1,690			
<b>Inorganics</b>								
Arsenic	6,300	26,000	2,100	4,100	2,400	5,600	25,000	18,000
Beryllium	790	2,300	660	1,200	480	1,200	2,900	1,100
Cadmium	2,800	9,100	870	3,300	800	2,500	9,200	4,200
Chromium	141,000	18,000	7,400	36,000	11,000	27,000	66,000	25,000
Copper	46,000	35,000	7,300	17,000	8,000	18,000	30,000	33,000
Lead	74,000	62,000	22,000	24,000	29,000	55,000	39,000	100,000
Mercury	100	66		67		70		160
Nickel	17,000	36,000	4,100	15,000	7,100	21,000	33,000	34,000
Selenium		2,600	200	390	150	820	4,500	1,700
Silver	470	400	320	350	240		470	470
Thallium	260	3,000				330	2,500	1,800
Zinc	140,000	341,000	21,000	77,000	42,000	100,000	369,000	130,000

All units reported in µg/kg unless otherwise noted.

**ATTACHMENT B**  
**SEDIMENT AND SURFACE WATER SAMPLE**  
**RESULTS FROM FINAL RFI REPORT**



# LEGEND

S-14, SW-2 (inverted triangle) PHASE I SEDIMENT SAMPLE (S) SURFACE WATER SAMPLE (SW)

S, SW-1 (filled triangle) PHASE II SEDIMENT SAMPLE (S) SURFACE WATER SAMPLE (SW)

0 250 500 1000  
APPROXIMATE SCALE: 1" = 500'

CWM CHEMICAL SERVICES INC.  
CHICAGO INCINERATOR  
RFI PHASE I AND PHASE II

**FIGURE 4-2**  
**Surface Water and Sediment Sample Locations**

DRN. BY: MG

PROJ. NO.: 13963-052-29

DATE: JUNE 1992

DAMES & MOORE

**TABLE 4-30**  
**PHASE I SURFACE WATER RESULTS**

PARAMETER (mg/l)	SW-1	SW-2	SW-3	SW-4	SW-5
Methylene Chloride	ND	0.003	0.003	ND	.0009
Alkalinity	120	140	120	120	120
Ammonia as N	2.8	2.0	0.48	0.29	0.34
BOD	4.0	4.0	2.0	2.0	2.0
Calcium	45.7	41.5	38.9	38.7	39.5
COD	24.0	34.0	12.0	< 10.0	< 10.0
Chloride	90.2	101.0	40.5	40.6	40.9
Cyanide, Total	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Magnesium	15.1	27.6	12.5	12.2	12.4
Nitrate + Nitrite	0.45	0.16	0.36	0.39	0.37
Phenolics, Total	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Potassium	4.8	14.0	2.8	2.7	3.0
Sodium	56.5	71.8	26.0	24.0	26.0
Total Suspended Solids	124	44.0	42.0	38.0	54.0
Sulfate as SO <sub>4</sub>	45.8	114	34.8	34.6	34.4
Total Dissolved Solids	300	430	220	200	220
Total Organic Carbon	7.40	13.1	3.5	4.4	3.6
pH (Field)	8.05	7.97	8.43	8.28	8.27
Specific Cond. (Field) umhos/cm	632	452	458	458	450
Temperature (Field) Deg. C.	15.3	13.6	12.7	14.2	14.5

ND - Nondetect

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**TABLE 4-31**  
**PHASE II SURFACE WATER RESULTS**

Sample Location	Mercury ( $\mu\text{g/l}$ )	pH	Specific Conductance (umhos/cm)	Temperature in Deg. C
SW-1	ND	8.17	813	15.5
SW-2	ND	8.20	799	9.6
SW-3	ND	8.05	559	8.2
SW-4	ND	8.05	536	5.9
SW-5	0.20	7.80	555	8.1
SW-6	ND	7.82	540	1.9
SW-7	ND	7.86	543	5.7
SW-8	ND	7.98	540	2.1
SW-9	ND	8.04	544	4.7
SW-10	ND	8.18	546	5.8
SW-11	ND	8.14	537	2.0
SW-12	ND	7.60	537	2.3
SW-13	ND	7.84	542	2.1
SW-14	ND	7.85	540	1.8
SW-15	ND	8.17	798	9.3

ND - Nondetect

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**TABLE 4-32**  
**PHASE I SEDIMENT RESULTS**  
**INORGANICS**

	Ammonia as N (mg/l)	Calcium (mg/l)	COD (mg/l)	Chloride (mg/l)	Cyanide, Total (mg/l)	Magnesium (mg/l)	Nitrate + Nitrite (mg/l)	Phenolics, Total (mg/l)	Potassium (mg/l)	Sodium (mg/l)	Sulfate as SO <sub>4</sub> (mg/l)
S-1	189.00	75200	75000	135.0	< 1.09	32000	4.00	1.10	2000	150	187.00
S-2	175.00	63400	100000	83.0	< 0.97	28900	1.70	1.30	1700	ND	< 108.00
S-3	133.00	63600	92000	82.0	< 1.01	28300	1.00	2.10	1300	ND	< 102.00
S-4	69.00	47400	58000	34.0	< 0.68	22500	< 0.78	0.46	940	78	< 78.00
S-5	64.00	27900	35500	24.0	< 0.62	13900	2.30	0.79	640	ND	< 67.00
S-7	149	84200	52700	27.0	< 0.66	43300	5.7	< 0.37	870	ND	< 73
S-8	182.00	76300	88000	131.0	< 0.99	36200	2.60	< 1.30	1300	110	204.00
S-9	137.00	62500	93000	58.7	< 1.05	29000	3.60	< 2.20	2100	230	< 112.00
S-11	46.1	59900	62700	73.2	< 0.81	28100	4.4	< 1.5	700	160	216
S-12	164	53000	107000	211.0	< 1.33	18200	7.3	< 2.6	2200	420	634
S-13	192.00	64500	110000	188.0	< 1.26	22700	4.20	< 2.40	2200	400	485.00
S-14	229.00	61300	110000	265.0	< 1.45	20000	10.40	< 2.90	2400	430	397.00
S-15	174.00	110	152	1.2	-	ND	5.70	< 2.00	ND	ND	510.00
S-16	21.10	29500	50000	27.2	< 0.70	15200	3.60	< 1.50	630	100	< 70.00
S-17	119.00	66400	91800	78.0	< 0.90	31500	6.10	< 1.20	1700	120	< 100.00
S-18	61.00	42700	88500	110.1	< 1.08	19600	2.90	< 1.90	1100	95	117.0
S-19	52.80	56100	48200	52.6	< 0.70	28800	1.50	< 0.42	640	180	< 48.90
S-20	46.7	60500	38500	26.4	< 0.73	32900	2.1	< 0.39	580	220	< 70.3
S-21	31.30	25900	45500	19.3	< 0.68	13700	1.90	< 0.34	700	ND	< 67.90

**TABLE 4-32 (Cont.)  
PHASE I SEDIMENT RESULTS  
INORGANICS**

	Ammonia as N (mg/l)	Calcium (mg/l)	COD (mg/l)	Chloride (mg/l)	Cyanide, Total (mg/l)	Magnesium (mg/l)	Nitrate + Nitrite (mg/l)	Phenolics, Total (mg/l)	Potassium (mg/l)	Sodium (mg/l)	Sulfate as SO <sub>4</sub> (mg/l)
S-22	8.80	82100	30700	10.3	< 0.63	43700	< 0.61	< 0.72	690	ND	< 61.30
S-23	23.40	42100	36500	37.9	< 0.69	21700	1.60	< 1.30	500	170	< 67.40
S-24	26.7	57100	53000	23.6	< 0.71	29100	4.7	< 0.5	620	370	< 69.3
S-25	172.00	72500	82400	61.6	< 0.79	30600	2.00	< 1.8	770	120	112.00
S-26	132.00	70600	64000	87.0	< 1.08	31100	2.50	< 1.30	1300	130	124.00
S-27	201.00	62400	68000	82.0	< 1.21	24800	3.90	< 1.30	2200	190	153.00
S-28	83.30	59700	73000	31.8	< 0.79	28600	1.80	< 1.00	ND	1400	111.00
S-29	81.00	66600	94500	80.4	< 1.10	25600	< 1.20	< 1.30	1800	150	178.00
S-30	164.00	57000	111000	62.4	< 0.95	18500	6.70	< 1.90	1400	320	< 102.00

ND - Nondetect

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**TABLE 4-33**  
**PHASE I SEDIMENT RESULTS**  
**METALS**

	Antimony	Arsenic	Beryllium	Cadmium	Chromium	Copper	Lead	Nickel	Silver	Zinc
S-1	20.0	26.0	0.59	0.77	38.0	66.0	120	39.0	ND	330
S-2	ND	26.0	0.50	0.68	30.0	49.0	91.0	32.0	ND	260
S-3	18.0	25.0	0.45	0.58	28.0	49.0	88.0	30.0	ND	260
S-4	24.0	30.0	0.29	ND	13.0	25.0	50.0	23.0	ND	220
S-5	ND	22.0	0.23	1.40	8.80	ND	29.0	11.0	ND	160
S-6	-	-	-	-	-	-	-	-	-	-
S-7	17.0	32.0	0.29	0.43	14.0	28.0	56.0	18.0	ND	200
S-8	ND	20.0	0.68	2.80	28.0	57.0	110	31.0	2.6	290
S-9	ND	18.0	0.78	1.90	31.0	53.0	120	32.0	2.2	270
S-10	ND	17.0	1.10	2.00	39.0	57.0	160	39.0	ND	310
S-11	ND	15.0	0.42	2.00	15.0	31.0	150	20.0	2.2	190
S-12	ND	17.0	0.88	1.40	ND	46.0	130	33.0	ND	270
S-13	ND	12.0	1.0	2.00	38.0	56.0	150	39.0	ND	310
S-14	ND	3.8	1.0	1.90	37.0	53.0	150	41.0	ND	300
S-15	ND	17.0	0.86	2.70	36.0	65.0	170	40.0	ND	310
S-16	ND	27.0	0.28	0.88	9.20	25.0	33.0	13.0	ND	130



**TABLE 4-33 (Cont.)  
PHASE I SEDIMENT RESULTS  
METALS**

	Antimony	Arsenic	Beryllium	Cadmium	Chromium	Copper	Lead	Nickel	Silver	Zinc
S-17	22.0	20.0	0.50	0.45	29.0	53.0	94.0	36.0	ND	290
S-18	17.0	14.0	0.35	0.310	20.0	34.0	63.0	22.0	ND	190
S-19	ND	23.0	0.45	3.60	14.0	26.0	46.0	18.0	ND	160
S-20	ND	28.0	0.46	4.00	12.0	23.0	42.0	16.0	1.6	250
S-21	11.0	24.0	0.21	ND	9.10	22.0	29.0	14.0	ND	170
S-22	15.0	35.0	0.21	ND	6.90	21.0	22.0	17.0	ND	55.0
S-23	ND	28.0	0.44	4.00	13.0	31.0	50.0	19.0	ND	240
S-24	ND	87.0	0.51	4.40	16.0	33.0	66.0	21.0	ND	250
S-25	ND	18.0	0.57	2.50	25.0	37.0	77.0	25.0	2.3	240
S-26	ND	21.0	0.64	2.50	30.0	49.0	100	28.0	2.2	280
S-27	ND	18.0	0.99	3.70	51.0	74.0	160	43.0	3.1	410
S-28	15.0	17.0	0.51	0.80	33.0	46.0	110	34.0	ND	373
S-29	26.0	26.7	0.73	0.89	54.0	65.0	150	40.0	ND	380
S-30	ND	16.0	1.20	3.10	72.0	64.0	130	37.0	2.4	420

ND - Nondetect

All concentrations reported as mg/kg

No sample was collected at S-6, insufficient sample volume.

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**TABLE 4-34**  
**PHASE II SEDIMENT RESULTS**  
**METALS**

PARAMETER (mg/kg)	S-1	S-2	S-3	S-4	S-5	S-6	S-7	S-8	S-9	S-10
Antimony	ND	ND	ND	ND	12.0	ND	ND	ND	ND	ND
Arsenic	16.0	14.0	13.0	14.0	8.1	6.5	11.0	7.9	17.0	32.0
Beryllium	1.1	1.2	0.57	1.6	1.6	0.93	0.61	0.47	0.56	1.1
Cadmium	3.6	6.6	3.1	4.5	6.2	4.1	2.5	2.1	2.2	4.9
Chromium	50.0	198	25.0	100	60.0	25.0	30.0	139	13.0	21.0
Copper	35.0	22.0	27.0	24.0	27.0	30.0	27.0	12.0	65.0	60.0
Lead	72.0	48.0	80.0	33.0	37.0	86.0	50.0	41.0	120	400
Mercury	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Nickel	16.0	12.0	14.0	18.0	18.0	16.0	15.0	5.0	12.0	16.0
Zinc	97.0	74.0	150	140	140	120	82.0	35.0	120	499

ND - Nondetect

All concentrations in (mg/kg)

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**TABLE 4-35**  
**PHASE I SEDIMENT RESULTS**  
**ORGANICS**

	Units	S-1	S-2	S-3	S-4	S-5	S-6	S-7	S-8	S-9	S-10
Acenaphthene	mg/kg	ND	ND	ND	ND	ND	-	ND	ND	ND	ND
Anthracene	mg/kg	ND	ND	ND	ND	ND	-	0.349	ND	ND	ND
Benzo(a)anthracene	mg/kg	ND	ND	ND	ND	ND	-	ND	ND	ND	ND
Benzo(a)pyrene	mg/kg	0.526	0.589	ND	ND	ND	-	0.539	0.622	ND	ND
Benzo(k)fluoranthene	mg/kg	ND	ND	ND	ND	ND	-	ND	ND	ND	ND
Benzo(b)fluoranthene	mg/kg	ND	ND	ND	ND	ND	-	ND	ND	ND	ND
Crysene	mg/kg	0.908	0.843	0.820	ND	0.424	-	0.678	0.557	ND	ND
Fluoranthene	mg/kg	1.280	1.340	1.220	0.355	0.847	-	1.490	0.973	ND	ND
Fluorene	mg/kg	ND	ND	ND	ND	ND	-	ND	ND	ND	ND
Phenanthrene	mg/kg	ND	ND	ND	ND	ND	-	1.200	ND	ND	ND
Napthalene	mg/kg	ND	ND	ND	ND	ND	-	ND	ND	ND	ND
Pyrene	mg/kg	1.280	1.230	1.070	0.330	0.835	-	1.350	0.844	ND	ND
Phenol	mg/kg	0.881	1.160	1.070	ND	0.840	-	0.792	ND	ND	ND
Heptachlor	mg/kg	ND	ND	0.034	ND	ND	-	0.018	ND	ND	ND
Bis(2Ethylhexyl) Phthate	mg/kg	ND	ND	ND	ND	ND	-	ND	ND	ND	ND
1,2 Trans-Dichloroethylene	mg/kg	ND	ND	ND	0.003	0.002	-	0.012	0.003	ND	ND
Tetrachloroethylene	mg/kg	ND	ND	ND	ND	ND	-	ND	ND	ND	ND
Trichloroethylene	mg/kg	ND	ND	ND	0.002	ND	-	ND	ND	ND	ND
Methylene Chloride	mg/kg	0.011	0.009	0.432	0.035	0.019	-	0.214	0.013	0.011	0.014

ND - Nondetect

No sample was collected at S-6, insufficient sample volume.

**TABLE 4-35 (Cont.)  
PHASE I SEDIMENT RESULTS  
ORGANICS**

	Units	S-11	S-12	S-13	S-14	S-15	S-16	S-17	S-18	S-19	S-20
Acenaphthene	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Anthracene	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	mg/kg	ND	ND	ND	ND	ND	ND	ND	0.594	ND	ND
Benzo(k)fluoranthene	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(b)fluoranthene	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Crysene	mg/kg	ND	ND	ND	ND	ND	ND	ND	0.934	0.502	ND
Fluoranthene	mg/kg	9.410	ND	ND	1.460	ND	ND	0.859	1.460	0.799	0.785
Fluorene	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Napthalene	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pyrene	mg/kg	8.220	ND	ND	1.360	4.660	ND	0.750	1.410	0.760	0.681
Phenol	mg/kg	ND	ND	ND	ND	ND	ND	ND	1.060	0.705	ND
Heptachlor	mg/kg	ND	ND	ND	ND	ND	ND	ND	0.043	ND	ND
Bis(2Ethylhexyl) Phthate	mg/kg	ND	ND	ND	ND	ND	ND	8.160	ND	ND	ND
1,2 Trans-Dichlorethylene	mg/kg	ND	ND	0.002	0.003	0.002	ND	0.002	ND	ND	ND
Tetrachloroethylene	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethylene	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene Chloride	mg/kg	0.012	0.016	0.017	0.015	0.012	0.493	0.022	0.011	0.032	0.037

ND - Nondetect

**TABLE 4-35 (Cont.)**  
**PHASE I SEDIMENT RESULTS**  
**ORGANICS**

	Units	S-21	S-22	S-23	S-24	S-25	S-26	S-27	S-28	S-29	S-30
Acenaphthene	mg/kg	ND	ND	ND	0.316	ND	ND	ND	ND	ND	ND
Anthracene	mg/kg	0.440	ND	ND	0.872	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	mg/kg	ND	ND	ND	1.230	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	mg/kg	0.608	ND	ND	0.806	0.833	0.758	ND	0.658	1.100	ND
Benzo(k)fluoranthene	mg/kg	ND	ND	ND	0.611	0.586	0.586	ND	ND	0.987	ND
Benzo(b)fluoranthene	mg/kg	ND	ND	ND	ND	0.879	ND	ND	ND	ND	ND
Crysene	mg/kg	0.627	ND	ND	1.370	0.846	0.875	ND	0.964	1.850	ND
Fluoranthene	mg/kg	1.570	ND	0.621	3.720	1.230	1.590	ND	1.660	2.430	ND
Fluorene	mg/kg	ND	ND	ND	0.742	ND	ND	ND	ND	ND	ND
Phenanthrene	mg/kg	1.410	ND	ND	3.120	ND	ND	ND	ND	1.330	ND
Napthalene	mg/kg	ND	ND	ND	2.010	ND	ND	ND	ND	ND	ND
Pyrene	mg/kg	1.290	ND	0.556	3.450	1.110	1.430	ND	1.450	2.220	ND
Phenol	mg/kg	0.923	0.560	0.820	ND	ND	ND	ND	ND	1.160	ND
Heptachlor	mg/kg	0.015	ND	ND	ND	ND	ND	ND	ND	0.072	ND
Bis(2Ethylhexyl) Phthate	mg/kg	ND	ND	4.530	ND	ND	ND	ND	ND	ND	ND
1,2 Trans-Dichlorethylene	mg/kg	0.003	0.002	ND	ND	ND	ND	0.002	ND	ND	ND
Tetrachloroethylene	mg/kg	ND	0.013	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethylene	mg/kg	ND	0.006	ND	ND	ND	ND	ND	ND	ND	ND
Methylene Chloride	mg/kg	0.021	0.033	0.031	0.051	0.453	0.015	0.013	0.057	0.019	0.009

ND - Nondetect

a:\cwm-rcra\tables\table.435

**TABLE 4-36**  
**PHASE II SEDIMENT RESULTS**  
**ORGANICS**

PARAMETER (mg/kg)	S-1	S-2	S-3	S-4	S-5	S-6	S-7	S-8	S-9	S-10
Benzo(a)pyrene	4.74	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(b)fluoranthene	9.29	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(k)fluoranthene	3.60	ND	ND	ND	ND	ND	ND	ND	ND	ND
Crysene	7.16	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	10.1	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pyrene	12.4	ND	ND	ND	ND	3.30	ND	ND	ND	5.97
Fluoranthene	16.1	ND	2.86	ND	ND	3.39	ND	ND	ND	8.07
Benzene	ND	ND	ND	0.013	0.008	ND	ND	ND	ND	ND
Di-n-butyl Phthalate	ND	ND	ND	ND	ND	17.9	ND	ND	ND	ND

ND - Nondetect  
All concentrations in (mg/kg).

a:\cwm-rcra\tables\table.436

B-16-CA-2

USEPA

RFI work plan

# Clean Harbors®

ENVIRONMENTAL SERVICES, INC.

325 WOOD ROAD, P.O. BOX 327 • BRAINTREE, MA 02184-2402  
(617) 849-1800

WRITER'S DIRECT NUMBER

Extension 4182

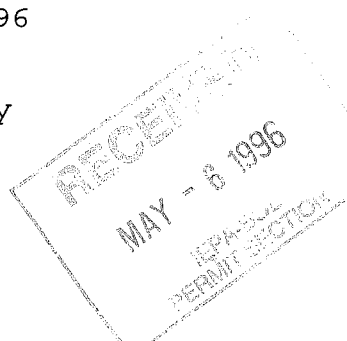
LAW DEPARTMENT

(617) 849-1800

FAX (617) 356-1375

May 6, 1996

Illinois Environmental Protection Agency  
Attn: Edwin C. Bakowski, Manager  
Permit Section, Bureau of Land  
2200 Churchill Road  
Springfield, Illinois 62794-9276

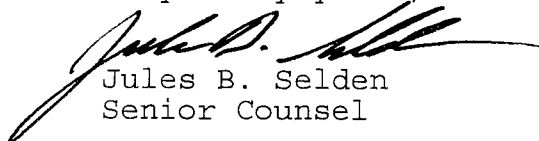


Re: 0316000051 - Cook County  
Clean Harbors of Chicago, Inc.  
ILD000608471  
Log No. 16  
RCRA Permit

Dear Mr. Bakowski:

Enclosed please find four (4) copies of the RCRA Facility Investigation Phase II/III Work Plan for the Clean Harbors of Chicago, Inc. facility located at 11800 South Stony Island Avenue, Chicago, Illinois. Also enclosed is the Certification required by Ill. Adm. Code, Title 35, §702.126(d).

Very truly yours,

  
Jules B. Selden  
Senior Counsel

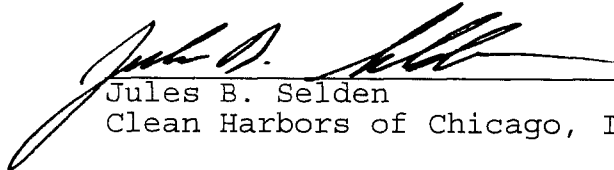
Enclosure

cc: Carlson Environmental, Inc. (enc)  
James R. Laubsted (enc)  
David P. Trainor - Dames & Moore (enc)



#### CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of the fine and imprisonment for knowing violation.

  
Jules B. Selden  
Clean Harbors of Chicago, Inc.





State of Illinois  
**ENVIRONMENTAL PROTECTION AGENCY**

Mary A. Gade, Director

2200 Churchill Road, Springfield, IL 62794-9276

217/524-3300

August 16, 1994

Mr. Paul Ahearn  
Clean Harbors of Chicago, Inc.  
11800 South Stony Island Avenue  
Chicago, Illinois 60617

Re: 0316000051 - Cook County  
Clean Harbors of Chicago, Inc.  
ILD000608471  
Log No.: B-16  
Received: August 12, 1994  
RCRA Permit

Dear Mr. Ahearn:

The Pre-Construction Sampling/Analysis Investigation for the above-referenced facility was submitted via facsimile by Clean Harbors has been reviewed by this Agency. This workplan was submitted per an agreement between Clean Harbors and the Agency to investigate facility soils prior to construction to prevent duplicative efforts and potential removal of structures to facilitate future corrective action investigations in the future. The workplan is hereby approved subject to the following conditions and modifications:

1. It is understood that the intent of this sampling/analysis effort is to determine if residual soil contamination exists to such levels that warrant immediate removal (e.g., excavation), and treatment, storage or disposal of the excavated materials. As noted above, the purpose of conducting this investigation prior to construction is to prevent removal of such structures during future corrective action investigations at the subject facility.
2. The pre-construction sampling and analysis shall be carried out to investigate for possible gross contamination and/or buried wastes or structures in the areas where the following units are proposed to be constructed in accordance with a temporary authorization request submitted to the Agency on August 3, 1994:
  - a. Rail Car Unloading Area - 13
  - b. Truck Scale - 14
  - c. Truck Staging Area - 59
  - d. Roll-Off Pad for Fuels Blending - 60
  - e. Container Handling/Truck Dock - 61/62

Should additional construction activities be conducted in the future prior to final

such visually discolored and/or contaminated areas. Sample size per interval shall be minimized to prevent dilution of any contamination.

6. Quality assurance/quality control procedures which meet the requirements of SW-846 must be implemented during all sampling/analysis efforts. In addition, sample collection, handling, preservation, preparation and analysis must be conducted in accordance with the procedures set forth in SW-846 and the requirements set forth in this letter.
7. A report documenting the results of the sampling/analysis results shall be submitted to the Agency after completion. This report must include:
  - a. identification of the reason for the sampling/analysis effort and the goals of the effort;
  - b. a summary in tabular form of all analytical data, including all quality assurance/quality control data;
  - c. a scaled drawing showing the horizontal location from which all soil samples were collected;
  - d. identification of the depth and vertical interval from which each sample was collected;
  - e. a description of the soil sampling procedures, sample preservation procedures and chain of custody procedures;
  - f. identification of the test method used and detection limits achieved, including sample preparation, sample dilution (if necessary) and analytical interferences;
  - g. copies of the final laboratory report sheets, including final sheets reporting all quality assurance/quality control data;
  - h. visual classification of each soil sample in accordance with ASTM D-2488;
  - i. a summary of all procedures used for quality assurance/quality control, including the results of these procedures; and
  - j. a discussion of the data as it is related to the overall goal of the sampling/analysis effort.
8. A report documenting the results of any excavation and treatment, storage and/or disposal of excavated structures or material, if determined to be necessary based upon the results of the sampling/analysis plan, shall be submitted to the Agency after completion. This report must include:



State of Illinois

# ENVIRONMENTAL PROTECTION AGENCY

Mary A. Gade, Director

2200 Churchill Road, Springfield, IL 62794-9276

217/524-3300

August 16, 1994

Mr. Paul Ahearn  
Clean Harbors of Chicago, Inc.  
11800 South Stony Island Avenue  
Chicago, Illinois 60617

Re: 0316000051 - Cook County  
Clean Harbors of Chicago, Inc.  
ILD000608471  
Log No.: B-16  
Received: August 12, 1994  
RCRA Permit

Dear Mr. Ahearn:

The Pre-Construction Sampling/Analysis Investigation for the above-referenced facility was submitted via facsimile by Clean Harbors has been reviewed by this Agency. This workplan was submitted per an agreement between Clean Harbors and the Agency to investigate facility soils prior to construction to prevent duplicative efforts and potential removal of structures to facilitate future corrective action investigations in the future. The workplan is hereby approved subject to the following conditions and modifications:

1. It is understood that the intent of this sampling/analysis effort is to determine if residual soil contamination exists to such levels that warrant immediate removal (e.g., excavation), and treatment, storage or disposal of the excavated materials. As noted above, the purpose of conducting this investigation prior to construction is to prevent removal of such structures during future corrective action investigations at the subject facility.
2. The pre-construction sampling and analysis shall be carried out to investigate for possible gross contamination and/or buried wastes or structures in the areas where the following units are proposed to be constructed in accordance with a temporary authorization request submitted to the Agency on August 3, 1994:
  - a. Rail Car Unloading Area - 13
  - b. Truck Scale - 14
  - c. Truck Staging Area - 59
  - d. Roll-Off Pad for Fuels Blending - 60
  - e. Container Handling/Truck Dock - 61/62

Should additional construction activities be conducted in the future prior to final

issuance of a RCRA Part B permit modification by the Agency, Clean Harbors must submit a pre-construction sampling/analysis plan, similar in content to the subject submittal, to the Agency for review and approval.

3. All soil samples shall be analyzed individually (i.e., no compositing). Analytical procedures shall be conducted in accordance with Test Methods for Evaluating Solid Wastes, Third Edition (SW-846). When a SW-846 (Third Edition) analytical method is specified, all of the chemicals listed in the Quantitation Limits Table for that method shall be reported unless specifically exempted in writing by the Agency. Apparent visually contaminated material within a sampling interval shall be included in the sample portion of the interval to be analyzed. To demonstrate that a parameter is not present in a sample, analysis results must show a detection limit at least as low as the PQL for that parameter in the third edition of SW-846. For inorganic parameters, the detection limit achieved during the analysis of the TCLP extract must be at least as low as the RCRA Groundwater Detection Limits, as referenced in SW-846 (Third Edition) Volume 1A, pages TWO-29 and TWO-30, Table 2-15. Each sample collected for laboratory analysis must be analyzed for all parameters of 35 Ill. Adm. Code Part 724, Appendix I.
4. Use of a photoionization detector (PID) to conduct field screening of the sample intervals prior to sample preservation and shipment is acceptable to the Agency provided that Clean Harbors conduct the PID field analysis in such a manner that volatilization of organic compounds is not allowed or is minimized. Field readings of the PID, indicating the designated sample boring and sample depth interval, shall be included in the sampling/analysis report required under Condition 7 below.
5. The following procedures must be utilized in the collection of all required soil samples:
  - a. The procedures used to collect the soil samples must be sufficient so that all soil encountered is classified in accordance with ASTM Method D-2488;
  - b. If a drill rig or similar piece of equipment is necessary to collect required soil samples, then:
    1. The procedures specified in ASTM Method D-1586 (Split Spoon Sampling) or D-1587 (Shelby Tube Sampling) must be used in collecting the samples;
    2. Soil samples must be collected continuously at each of the borings, as proposed, to provide information regarding the shallow geology of the area where the investigation is being conducted;
  - c. All soil samples must be collected in accordance with the procedures set forth in SW-846; and
  - d. When visually discolored or contaminated material exists within an area to be sampled, horizontal placement of sampling locations shall be adjusted to include

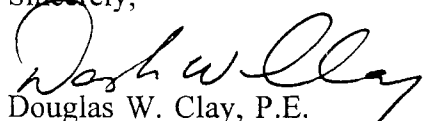
such visually discolored and/or contaminated areas. Sample size per interval shall be minimized to prevent dilution of any contamination.

6. Quality assurance/quality control procedures which meet the requirements of SW-846 must be implemented during all sampling/analysis efforts. In addition, sample collection, handling, preservation, preparation and analysis must be conducted in accordance with the procedures set forth in SW-846 and the requirements set forth in this letter.
7. A report documenting the results of the sampling/analysis results shall be submitted to the Agency after completion. This report must include:
  - a. identification of the reason for the sampling/analysis effort and the goals of the effort;
  - b. a summary in tabular form of all analytical data, including all quality assurance/quality control data;
  - c. a scaled drawing showing the horizontal location from which all soil samples were collected;
  - d. identification of the depth and vertical interval from which each sample was collected;
  - e. a description of the soil sampling procedures, sample preservation procedures and chain of custody procedures;
  - f. identification of the test method used and detection limits achieved, including sample preparation, sample dilution (if necessary) and analytical interferences;
  - g. copies of the final laboratory report sheets, including final sheets reporting all quality assurance/quality control data;
  - h. visual classification of each soil sample in accordance with ASTM D-2488;
  - i. a summary of all procedures used for quality assurance/quality control, including the results of these procedures; and
  - j. a discussion of the data as it is related to the overall goal of the sampling/analysis effort.
8. A report documenting the results of any excavation and treatment, storage and/or disposal of excavated structures or material, if determined to be necessary based upon the results of the sampling/analysis plan, shall be submitted to the Agency after completion. This report must include:

- a. identification for the reason for the excavation effort;
  - b. a scaled drawing showing the horizontal and vertical extent of any excavation(s) with respect to the facility boundaries or relevant structures at the site;
  - c. an estimate of the total volume of materials excavated;
  - d. a waste characterization of the excavated material which identifies whether the material is hazardous waste or not. Copies of relevant chemical/physical analytical reports must be included to substantiate this determination.
  - e. copies of waste manifests documenting treatment, storage or disposal of this material off-site.
9. Under the provisions of 29 CFR 1910 (51 FR 15,654, December 19, 1986), cleanup operations must meet the applicable requirements of OSHA's Hazardous Waste Operations and Emergency Response Standard. These requirements include hazard communication, medical surveillance, health and safety programs, air monitoring, decontamination and training. General site workers engaged in activities that expose or potentially expose them to hazardous substances must receive a minimum of 40 hour safety and health training off-site, plus a minimum of three day of actual field experience under the direct supervision of a trained experienced supervisor. Managers and supervisors at the cleanup site must have at least an additional eight hours of specialized training on managing hazardous waste operations.

Should you have any questions or comments regarding this matter, please contact Eric Minder at 217/524-3274.

Sincerely,



Douglas W. Clay, P.E.  
Hazardous Waste Branch Manager  
Permit Section, Bureau of Land

DWC:EM

cc: USEPA Region V - George Hamper

JVM



ENVIRONMENTAL SERVICES, INC.

1200 CROWN COLONY DRIVE, P.O. BOX 9137 • QUINCY, MA 02269-9137  
(617) 849-1800

RECEIVED  
WMD RECORD CENTER

JUN 16 1994

WRITER'S DIRECT NUMBER

Extension 4182

LAW DEPARTMENT

(617) 849-1800

FAX (617) 786-9716

May 10, 1994

Illinois Environmental Protection Agency  
Attn: Douglas Clay, Hazardous Waste Branch Manager  
Permit Section  
Division of Land Pollution Control  
Bureau of Land  
2200 Churchill Road  
Springfield, Illinois 62794

D.2.1

Re: 03160051 - Cook County  
Clean Harbors of Chicago, Inc.  
ILD000608471  
Log No. 16  
RCRA Permit

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JUN 16 1994

Dear Mr. Clay:

Clean Harbors of Chicago, Inc. is presently testing and evaluating the integrity of certain SWMU's, the results of which will be incorporated into the RFI Phase I Work Plan. Pursuant to my earlier correspondence dated February 24, 1994 and the IEPA's response thereto dated March 23, 1994, the RFI Phase I Work Plan is currently scheduled for submittal on June 1, 1994.

I have been advised that the integrity testing will take longer than we had originally anticipated. This is due to the time needed for review of the contractor's health and safety plan, the time needed to process a multitude of confined space entry permits, and the scheduling of certain testing on consecutive Mondays so as not to interfere with operations. Earlier today Ms. Valerie Farrell, of Carlson Environmental, Inc. spoke with Mr. Eric Minder of your staff and explained the situation. Mr. Minder indicated that he would have no problem with Clean Harbors' requesting additional time for preparation of the Work Plan.

RECEIVED

MAY 12 1994

IEPA  
PERMIT SECTION

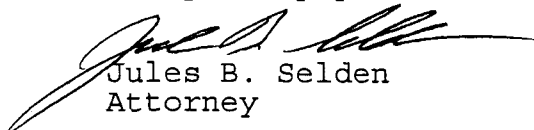
"People and Technology Creating a Better Environment"



Illinois Environmental Protection Agency  
May 10, 1994  
Page 2

Clean Harbors hereby requests that the submittal date of the RFI Phase I Work Plan be further extended until August 1, 1994.

Very truly yours,

A handwritten signature in dark ink, appearing to read "Jules B. Selden", written over the typed name and title.

Jules B. Selden  
Attorney

cc: James Laubsted  
Valerie Farrell - CEI





ENVIRONMENTAL SERVICES, INC.

1200 CROWN COLONY DRIVE, P.O. BOX 9137 • QUINCY, MA 02269-9137  
(617) 849-1800

MAS  
Amended  
Safety Permit  
cont. Bldg 10

WRITER'S DIRECT NUMBER

Extension 4182

LAW DEPARTMENT

(617) 849-1800

FAX (617) 786-9716

January 25, 1994

B.1.1

Illinois Environmental Protection Agency  
Attn: Mr. Lawrence W. Eastep, Manager  
Permit Section  
Division of Land Pollution Control  
Bureau of Land  
2200 Churchill Road  
Springfield, Illinois 62794

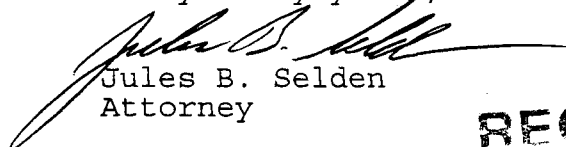
Re: 03160051 - Cook County  
Clean Harbors of Chicago, Inc.  
ILD000608471  
Log No. 16  
RCRA Permit

Dear Mr. Eastrep:

I have personal responsibility for the oversight and direct management of corrective action at all Clean Harbors facilities, including Clean Harbors of Chicago, Inc. Pursuant to 35 Ill. Adm. Code 702.126(b)(3), enclosed please find a written authorization from the President of Clean Harbors of Chicago, Inc. authorizing me to sign all reports and other submittals to the Illinois Environmental Protection Agency which are required by the Corrective Action Provisions contained in Section IV of Clean Harbors of Chicago, Inc.'s RCRA Hazardous Waste Part B Permit.

Please direct all future Agency correspondence regarding corrective action to my attention at the letterhead address. If you have any questions, please contact me at (617) 849-1800, extension 4182.

Very truly yours,



Jules B. Selden  
Attorney

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JAN 28 1994

IEPA-BOL  
PERMIT SECTION

Enclosure

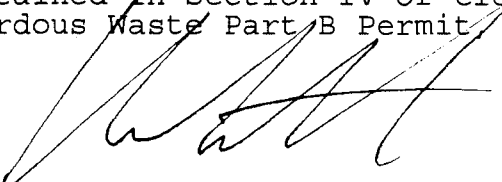


CLEAN HARBORS OF CHICAGO, INC.

SIGNATURE AUTHORIZATION

From: Michael R. Hatch, President  
To: Jules B. Selden  
Date: January 24, 1994  
Subject: Signature Authorization for Reports to Be Submitted to the Illinois Environmental Protection Agency Pursuant to the Corrective Action Provisions of Clean Harbors of Chicago, Inc.'s RCRA Hazardous Waste Management Part B Permit

Pursuant to 35 Ill. Adm. Code 702.126(b) you are hereby authorized to sign all reports and other submittals to the Illinois Environmental Protection Agency which are required by the Corrective Action Provisions contained in Section IV of Clean Harbors of Chicago, Inc.'s RCRA Hazardous Waste Part B Permit, ILD No. 000608471.



Michael R. Hatch  
President



ENVIRONMENTAL SERVICES, INC.

1200 CROWN COLONY DRIVE, P.O. BOX 9137 • QUINCY, MA 02269-9137  
(617) 849-1800

B-16  
WRITER'S DIRECT NUMBER

Extension 4182

LAW DEPARTMENT

(617) 849-1800

FAX (617) 786-9716

February 24, 1994

Illinois Environmental Protection Agency  
Attn: Douglas Clay, Hazardous Waste Branch Manager  
Permit Section  
Division of Land Pollution Control  
Bureau of Land  
2200 Churchill Road  
Springfield, Illinois 62794

Re: 03160051 - Cook County  
Clean Harbors of Chicago, Inc.  
ILD000608471  
Log No. 16  
RCRA Permit

RECEIVED

MAR - 2 1994

PERMIT SECTION

Dear Mr. Clay:

Pursuant to the corrective action provisions of Clean Harbors of Chicago, Inc.'s ("Clean Harbors") RCRA Part B Permit, an RFI Phase I Work Plan is to be submitted to IEPA within 120 days of the Permit's effective date. Clean Harbors engaged Carlson Environmental, Inc. (CEI) as its consultant for corrective action, and, after some initial site investigation and a review of the Permit's corrective action provisions, CEI identified some issues and concerns. On December 17, 1993, CEI and myself met with Messrs. James Moore and Eric Minder of IEPA to discuss CEI's concerns and to agree on a course of action. On January 5, 1994, Messrs. Moore and Minder visited the facility to assess the SWMUs identified in the Permit as requiring corrective action. As a result of the January 5th site visit, IEPA sent a letter to Clean Harbors wherein IEPA further identified which SWMUs need to be evaluated for the RFI and recommended actions to be taken for each SWMU.

Included in the IEPA recommended actions are integrity inspections/evaluations of five specified SWMUs and the inclusion of the results in the RFI Phase I Work Plan. Clean Harbors has directed

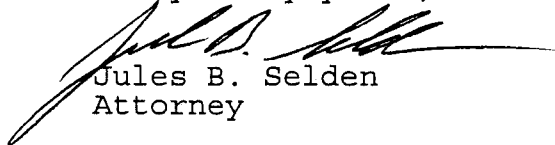


Illinois Environmental Protection Agency  
February 24, 1994  
Page 2 of 2

CEI to follow the IEPA recommendations, and the inspections and evaluations will be commenced shortly. Based upon the time it will take to negotiate a contract with a qualified firm to perform this task, obtain the results and incorporate the results in the RFI Phase I Work Plan, Clean Harbors hereby requests that the submittal date of the RFI Phase I Work Plan be extended to June 1, 1994.

If you have any questions please do not hesitate to contact me.

Very truly yours,

A handwritten signature in dark ink, appearing to read "Jules B. Selden".

Jules B. Selden  
Attorney

cc: Michael R. Hatch  
James R. Laubsted  
Jeffrey S. Clark - CEI  
Valerie Farrell - CEI



**CARLSON ENVIRONMENTAL, Inc.**

cc: Maywood  
USEPA

RECEIVED  
JAN 11 1994

JHR  
EM

OFFICE OF RCRA  
WASTE MANAGEMENT DIV  
EPA REGION

December 27, 1993

RECEIVED JAN 13 1994  
WMD RCRA  
RECORD CENTER

PN 8666

Mr. Lawrence W. Eastep  
Illinois Environmental Protection Agency  
Permit Section  
2200 Churchill Road  
Springfield, Illinois 62794

SUBJECT: Clean Harbors of Chicago, Inc., facility  
11800 South Stony Island Avenue  
Chicago, Illinois  
IEPA ID No. 0316000051  
U.S. EPA ID No. ILD000608471

RECEIVED

DEC 30 1993

IEPA  
PERMIT SECTION

Dear Mr. Eastep:

Carlson Environmental, Inc., (CEI) has been retained by Clean Harbors of Chicago, Inc., (Clean Harbors) to assist in the preparation of the RCRA Facility Investigation (RFI) Work Plan as outlined in the facility's Hazardous Waste Management Part B permit.

On December 17, 1993, Richard Carlson, Jeffrey Clark and Valerie Farrell of CEI and Mr. Jules Seldon of Clean Harbors met with Mr. Jim Moore and Mr. Eric Minder of IEPA in Springfield, Illinois. The purpose of this meeting was to discuss some potential issues/concerns associated with preparing the RFI Work Plan for the facility. CEI and Clean Harbors appreciate the opportunity to have met with IEPA staff and found the meeting very beneficial. Following is a summary of the issues discussed at the above referenced meeting.

- In order to facilitate discussions, Mr. Minder and Mr. Moore agreed to accompany CEI representatives on a site visit at the Clean Harbors facility. The site visit is tentatively scheduled for the first week of January 1994.
- Based on discussions at the site visit, CEI will prepare an outline defining a general approach for conducting the RFI Work Plan. CEI will submit the outline to Mr. Minder and Mr. Moore of IEPA for review and comments.





**CARLSON ENVIRONMENTAL, Inc.**

Mr. Lawrence W. Eastep

December 27, 1993

Page 2

- CEI will then develop Phase I of the RFI Work Plan based on the approach described above. Because this initial preparation will require some additional time, it is CEI's understanding that the current due date for the Phase I RFI Work Plan of March 4, 1994, will be extended if necessary.
- Finally, financial assurance requirements for the RFI will be submitted to IEPA on a phase by phase basis. Financial assurance for Phase I of the RFI will be submitted with the Phase I RFI Work Plan.

If you have any questions or would like additional information please contact Richard Carlson or me at (312) 346-2140.

Sincerely,

CARLSON ENVIRONMENTAL, INC.

Valerie Farrell  
Environmental Scientist

cc: Mr. Jules Seldon, Clean Harbors